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ANEMIA

IN

PORTO RICO

ENGLISH-ESPAÑOL

SAN JUAN, PORTO RICO
DECEMBER 1st, 1904

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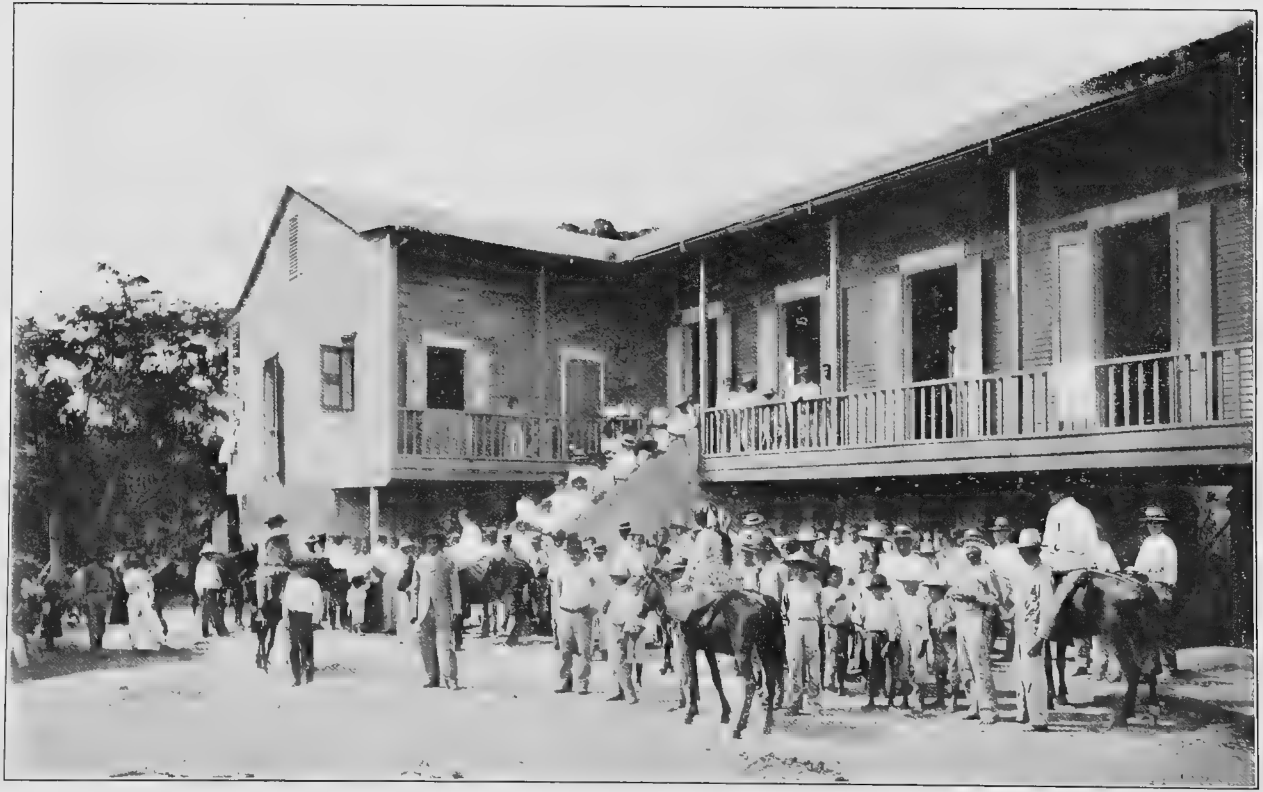

HOUSE OCCUPIED BY THE COMMISSION AND PATIENTS WAITING TO BE EXAMINED.

CASA-OFICINA DE LA COMISIÓN EN UTUADO Y GRUPOS DE PACIENTES ESPERANDO SER EXAMINADOS

REPORT

OF THE

Commission for the Study and Treatment of "Anemia" in Porto Rico.

Authorized by act of the Legislative Assembly,
approved February 16, 1904.

Respectfully submitted to
HONORABLE BEEKMAN WINTHROP,
Governor of Porto Rico.

DECEMBER 1, 1904.

BUREAU OF PRINTING AND SUPPLIES,
SAN JUAN, P. R.

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LETTER OF TRANSMITTAL.

San Juan, Porto Rico,

ERRATA.

Page 11, line 3: Read “19” instead of “76”
Page 20, line 1: Read “1847” instead of “1840”.
Page 50, line 15: Read “parasites” instead of “larvæ”
Page 51, par. 1, line 2: Read “geophagy” instead of “geogaphy’
Page 51, heading, last column of table 8: Read “geophagy” instead of “geogaphy”
Page 52, heading, last column of table: Read “geophagy” instead of “geogaphy”
Page 67, par. 2, line 5: Read “geophagy” instead of “geogaphy
Page 94, line 26: Read “undiluted” instead of “diluted”
Page LXVIII, Appendix, par. 2, line 2: Read “thirteen” instead of “fourteen”
Page LXVIII, Appendix, par. 3, line 2: Read “.23%” instead of “.25%”

Pedro Gutierrez Igaravidez, M. D. (Univ. of Seville.)
Health Officer of Bayamon, and Director of Municipal Hospital .

Honorable Beekman Winthrop,
Governor of Porto Rico,
San Juan, Porto Rico.

LETTER OF TRANSMITTAL.

San Juan, Porto Rico,
December 1, 1904.

Sir:—

We have the honor to submit the following report of the Commission named by the Governor of Porto Rico, by authority of "An Act to provide for the study and suppression of the disease known as 'Anemia' in Porto Rico".

Owing to limitations of time and space, it was not found possible to produce it complete in both English and Spanish, but it has been so arranged as to give the substance in each language, though parts of particular interest to readers of one language, are more in detail in that language.

Respectfully,

Bailey K. Ashford, M. D. (Georgetown Univ.)
Captain, Assistant Surgeon, U. S. Army.

W. W. King, M. D. (Univ. of Louisville.)
Passed Assistant Surgeon,
U. S. Public Health and Marine-Hospital Service.

Pedro Gutierrez Igaravidez, M. D. (Univ. of Seville.)
Health Officer of Bayamon, and Director of Municipal Hospital.

Honorable Beekman Winthrop,
Governor of Porto Rico,
San Juan, Porto Rico.

AN ACT

To provide for the study and suppression of the disease known as "Anemia" in Porto Rico

Be it enacted by the Legislative Assembly of Porto Rico:

SECTION 1.—The Governor is hereby authorized to take such measures as in his judgment may be most expedient to encourage the study and cure of the disease known as "tropical anemia" in Porto Rico.

SECTION 2.—For the prosecution of the work, the construction of field hospitals, the employment of temporary help, purchase of medicines, instruments, laboratory supplies, and other incidental expenses, the sum of five thousand dollars is hereby appropriated out of any moneys in the Treasury not otherwise appropriated, the said sum to be disbursed in such manner and for such purposes as the Governor may direct.

SECTION 3.—This act shall take effect from and after its passage.

EXECUTIVE MANSION,
February 16, 1904.

Approved:

Wm. H. Hunt,
Governor.

HISTORY OF UNCINARIASIS IN PORTO RICO.

The sequence of events which culminated in the formation of the present "Commission for the Study and Treatment of Anemia," really began immediately after the hurricane which devastated Porto Rico on August 8, 1899.

By order of Governor-General Geo. W. Davis, Dr. Bailey K. Ashford, then Post Surgeon at Ponce, established a field hospital of 136 beds for the treatment of those who could not be accommodated at the hospitals of that city. Fully three-fourths of those admitted were suffering from anemia which was then believed to be due to faulty diet. Later as generous food, with iron and arsenic, failed to cure, the condition was attributed to malaria, climate, lack of hygiene, etc., all of which proved upon investigation, to be inadequate causes. Some physicians declared it to be "pernicious anemia", and with this idea, blood examinations were made by Dr. Ashford. The high eosinophilia, found in many cases, led him to suspect the ankylostoma as the cause. Microscopical examination of feces made the suspicion a certainty.

As far as we have been able to learn, his was the first demonstration of this parasite in Porto Rico. R. Blanchard, in 1888 ("Traité de Zoologie Médicale") referring to the finding of the parasite in other West India Islands and Brazil, concludes that the disease is present in Porto Rico as well. He makes no statement of finding the parasite in this Island and little or no attention was paid here to his conclusion, which was unknown to Dr. Ashford in 1899.

The demonstration of the parasite was immediately reported to Chief Surgeon John Van R. Hoff, President of the Superior Board of Health of Porto Rico, who had a small pamphlet on the disease printed and distributed throughout the island. Unfortunately it produced no practical results, the belief being general that poor food, climate, lack of hygiene, etc., were the true causes in most cases.

In 1902, through the kindness of Dr. Luis Aguerrevere, the Director, two wards, male and female, in the Tricoche Hospital in Ponce, were placed at the disposal of Drs. Ashford and King for the treatment of anemics. From studies made there, a report on 100 cases was published in "American Medicine", September 5th and 12th, 1903. The disease was then termed "uncinariasis" as Dr. Ch. Wardell Stiles, Zoologist of the Public Health and Marine-Hospital Service, had announced that the parasite was a different variety, which he called "uncinaria americana" to distinguish it from the "ankylostoma duodenale."

The report of these cases awakened considerable interest and at the annual meeting of the Asociación Médica de Puerto Rico, in December 1903, Dr. Ashford was invited to deliver an address on this subject. The paper aroused much discussion, and a committee of three members was appointed to prepare a critical review of it. In April, 1904, a report was made, confirmatory as to the essential features and non-committal on some minor points. In the meantime, Hon. Wm. H. Hunt, then Governor of Porto Rico, and Hon. Régis H. Post, at that time Auditor of Porto Rico, had become deeply interested, and fully appreciated the great economic importance of the disease in the Island. The Governor, in his message to the Legislative Assembly, January, 1904, specially called attention to the necessity of beginning an active campaign against the disease. A bill, providing for the formation of a commission for the study and treatment of anemia, and carrying with it an appropriation of $5000, was introduced by Mr. Post, passed by the Assembly, and approved, February 16, 1904, by the Governor.

Governor Hunt named the following as members of the Commission:—

Captain BAILEY K. ASHFORD, Assistant Surgeon, U. S. Army.

Passed Assistant Surgeon W. W. KING, Public Health and Marine-Hospital Service.

Dr. PEDRO GUTIERREZ IGARAVIDEZ, Health Officer of Bayamon, Porto Rico.

In addition to his duties as member of the Commission, Dr. Gutierrez acted as its Disbursing Officer.

At the request of Governor Hunt, the Secretary of War and the Secretary of the Treasury authorized Drs. Ashford and King to engage in this work. At no time was any payment made to them by the Insular Government for their services, but, in consideration for the loss to his private practice, Dr. Gutierrez received $150 monthly.

The method to be pursued was left entirely to the discretion of the Commission, and it was decided that a formal organization would be unnecessary but that all matters would be informally discussed as occasion should arise. It was determined that no member should devote himself exclusively to one, or several phases of the work, but that they should participate equally in all details, so that the conclusions finally drawn would represent the consensus of opinion of three individuals working along the same lines. Thus every observation would be confirmed by two others.

By approval of the War Department, the Surgeon-General of the Army lent to the Insular Government, the hospital tents, cots, bedding, and practically all of the camp equipage and utensils. Each member provided his own instruments and laboratory outfit. Had the Commission been obliged to purchase these articles out of the appropriation, there would not have been left sufficient money to carry on its operations. Even with this assistance, it was necessary to practice the strictest economy in all expenditures. Needed technical assistants, clerks, etc, could not be employed.

The Commission recognized that it was undertaking a delicate and arduous task, not only on account of its limited resources, but in the management of a class of people naturally suspicious of innovation and apprehensive of being made subjects of experimentation. We were advised that they were too ignorant to properly take the medicine in their homes; that they would not sleep in tents for fear of dampness and exposure to night air; that they were too irresponsible to be depended upon to return regularly for treatment. All of the members of the Commission speak Spanish and have considerable knowledge of the peculiar dialect and idioms of the "jibaro," or peasant. By the exercise of tact, patience, and kindness, we gained their confidence and faith, so that they would talk to us freely. We found them easily managed, respectful, obedient, deeply grateful, and much more intelligent than is generally believed, even in Porto Rico.

Many considerations led to the location of the hospital first at Bayamon. It was accessible to San Juan, our base of supplies. Rooms and beds for some patients in the Bayamon Municipal Hospital were placed at our service. It was desired to give the physicians of San Juan an opportunity to observe the practical work and the results of treatment. We regret that many were unable to visit the camp. Shortly after its opening, the Hon. Wm. H. Hunt, Governor; Charles Hartzell, Secretary; and Régis H. Post, Auditor, of Porto Rico, inspected the camp and workings of the Commission.

The site selected was in the rear of the Municipal Hospital, and was located in a field sloping toward a small stream beyond. In spite of heavy rains, the interior of the tents remained dry and comfortable. In fact, the tent hospital proved a complete success.

Authority for the use of the tents, etc., was received, by cable, March 7th. They were transported from San Juan to Bayamon, pitched, and ready for use, by the 14th. Each tent had a portable floor designed for us by Mr. Scott Truxtun. Two large sills supported, in notches, smaller cross pieces on which the flooring was laid. No nailing was necessary, yet it was always steady, easily laid, or taken up. Each tent contained six folding hospital cots except the dining and the administration tents. Along the bank of the stream, a row of eight tents was placed facing the one used for the dining-room, and between the latter and the Municipal Hospital building, was placed the administration tent. At a convenient distance, in one corner of the field, latrines were placed. The pail system was used, and each night the cans were carried to a distant field, the contents buried, the cans washed, limed, and dried before re-use. The latrine shacks, made of palm bark, were burned after removal of the hospital.

Food for the patients and employees was cooked at the kitchen of the Municipal Hospital, and in the same building, were located the office, dispensary, and laboratory of the Commission.

The personnel at Bayamon was:—

Apothecary,	$50.00	per month.
Housekeeper,	20.00	" "
Nurse, male,	6.00	" "
Nurse, female,	6.00	" "
Cook,	4.00	" "
General helpers, (2 at $4 each)	8.00	" "
Scavenger,	12.00	" "

Treatment of patients at Bayamon began on March 6th, in the Municipal Hospital, and continued until April 30th. During this period, 951 cases of anemia were treated, the data of which, will be discussed under their appropriate headings. Persons applying for medicine were required to bring, for microscopic examination, a small specimen of their feces. This fact soon became general knowledge, and they usually came provided.

Patients were first examined for the uncinaria. In 947 of the 951 cases, it was present and was the sole cause of anemia in nearly all cases, a few having some contributing cause, as advanced tuberculosis, chronic dysentery, etc. The remaining 4 cases were;—one of entero-colitis, Hb. 40%; one of dysentery, Hb. not known; and two cases in which no cause was found, Hb. 46% and 69%, respectively.

The presence of the parasites having been determined, the patient was sent to another room where the hemoglobin was estimated and the percentage recorded. A full clinical history was attempted in each case until increasing numbers at the daily clinic made it a physical impossibility, and we were compelled to limit ourselves to a record of hemoglobin and certain other information to be used in this report. Even after it was decided to move the camp to Utuado we continued to admit new patients in order to give them the benefit of even short and incomplete treatment, but we did not estimate their hemoglobin as the short time rendered such record of no particular value. There were 304 such cases and 76 others in which the hemoglobin was not recorded.

Patients were given a prescription which they presented to the apothecary who delivered the medicine with directions as to how it should be taken, the patients, or those accompanying them, being required to repeat these instructions until they were thoroughly understood. They were directed to return in one week for re-examination and more medicine, most of them doing so with more or less regularity. This fact alone is an eloquent testimonial of the efficacy of the treatment. Had they not felt better, they would not have continued to come long distances on foot, as many did.

The hospital was used for patients who were unable to return home, or who were so ill that we wished to have them under our personal observation while taking thymol. The latter class, as a rule, remained only three or four days in hospital, when they were discharged to give room to others. The majority of cases, both in Bayamon and Utuado, never were in the hospital and never received any food from us. Patients in the hospital were subsisted by the Commission, but no attempt was made to forward their recovery by extra diet. They received a sufficient quantity of good food, and were satisfied.

At the request of the Alcaldes of Naranjito and Toa Alta, visits were made to these towns on March 19th, and April 9th, respectively, and a large number of anemics were examined at each place. They were invited to come to the hospital at Bayamon, and many did so. It was our intention to establish sub-stations at these nearby towns but the members of the Commission were too busy to visit them regularly, and the plan was abandoned.

Our stay in Bayamon was saddened by the death of Dr. Enrique Rodriguez, an active volunteer assistant of the Commission since the inception of the work. His enthusiasm led him to overestimate his strength, and on April 9th, after a laborious day, he died suddenly of a heart affection. We lost not only his professional assistance but the companionship of a cultured gentleman and personal friend. His last words, addressed to members of the Commission at his bedside, were an earnest appeal not to allow his death to interfere in any way with our progress.

Our operations at Bayamon closed April 30th. The vast majority of patients then ceased to come, but some desired further treatment. Dr. A. Stahl, of Bayamon, who had been working with the Commission, was left in charge and supplied with medicines to treat such patients who continued their visits. His services continued until June

15th, and the results in these cases have been included in the Bayamon statistics.

From May 1st to 9th, we were occupied in moving the camp to Utuado, one of the most "anemic" districts of the Island. Considerable delay was caused by the difficulties of ox-cart transportation from Arecibo to Utuado, but on the 9th, the hospital was ready for occupancy, and the treatment of patients begun.

The Commission had previously visited Utuado and selected the hospital site, which was located in a field of high rolling ground across the Viví River from the town. The soil was sandy loam and so well drained that it never became muddy. The tents were arranged in the form of a rectangle, four on the long sides, with one at each end between the lines. One was used for a dining room. The former administration tent, being no longer needed as such, was converted into a bed tent, thus increasing the capacity from 48 to 54 beds. The same latrine system was used.

Some 200 yards from the hospital was a large country house rented by the Commission and used for quarters of employees, clinic rooms, dispensary, laboratory, and storerooms. Food for the camp patients and employees was cooked at the kitchen of the house.

The personnel at Utuado was:

Apothecary,	$25.00	per	month.
Housekeeper,	20.00	"	"
Nurse, male,	8.00	"	"
Nurse, female,	4.00	"	"
Cook,	4.00	"	"
Scavenger,	9.00	"	"
General helper,	4.00	"	"

In the organization of the work in Utuado, profiting by our experience in Bayamon, we were able to improve and better systemize our methods. Each patient was given an identification card giving case number, name, and residence. This card impressed upon the patient that he was under obligation to return at the time specified, and possibly explains, in large measure, why the Utuado cases returned with greater regularity than those at Bayamon. The record books were numbered to correspond to these cards, so that, when a patient returned, his previous record was easily found. Notes on condition, microscopic examination, treatment, etc., were entered at each visit, and in this way the information regarding the Utuado cases was made more complete than at Bayamon.

Anticipating that a large number of patients would be treated, it was decided not to attempt to take the percentage of hemoglobin on entrance and at each visit, except in special cases. On some days, between 500 and 600 patients were examined and treated, and to have estimated the hemoglobin of each, would have left no time for other things. At Bayamon the hemoglobin was recorded on entrance to show the grade of anemia, and the Utuado cases averaged about the same, or worse if there was any difference. The weekly records of a series of special cases at Utuado (see Appendix), were illustrative of the changes occurring in the other cases at Utuado and Bayamon. These special cases were a series of typical ones in which a weekly record of hemoglobin percentage, counts of red, and white cells, and differential leucocyte count was made.

The general procedure at Utuado was the same as at Bayamon with the exceptions noted.

Patients began to arrive early in the morning, in many cases having traveled since the day before, generally on foot, resting from time to time according to their strength, and it was no uncommon occurrence for them to have been several days on the road. Very bad cases were carried in hammocks to the camp, twelve such being received in a single day, of whom one died the same night.

The patients, arriving singly and in groups, congregated in the large "patio," or yard, adjoining the house. They were admitted by small groups according to their turn, and frequently had to wait several hours, yet little or no complaint was made. The very ill and those from a long distance were given a preference whenever possible. On light days, we were able to finish the clinic by noon or one o'clock, but others required until four or five in the afternoon. The remainder of the day was occupied with the blood studies, patients in hospital, etc., and most of the clerical work was done at night.

In the latter part of June, Dr. Tulio Lopez Gaztambide, of Arecibo, came to study and work with the Commission. By this time, the work was becoming so heavy that we prevailed upon him to continue his valuable services until the end of our stay in Utuado.

There seemed to be no end of applicants for treatment. Beginning with 10 to 20, by the latter part of July, we were receiving from 125 to 150 new patients daily. The rate continued to increase, and these, with the old patients returning, made our clinic from 300 to 600 per day. Not to speak of the physical strain upon ourselves, it was too great a tax upon our time and funds. Considering that the old patients should be given the preference, and desiring to continue as long as we could, in order to cure as many as possible, announcement was made that no new patients would be treated after July 23rd. After that date, only a few were received, generally very bad cases that we did not have the heart to turn away.

The same class of patients was admitted to the hospital in Utuado as in Bayamon. There were more of desperately ill ones, but not so many transient cases, as our experience in Bayamon proved to us that it was reasonably safe to allow thymol to be taken at home, even in severe cases. The patients on whom the weekly blood examinations were made, were kept in the hospital or about the camp, if possible, in order to have them present at the proper time. The demand for beds soon became a serious question, as every day, applicants came, to whom it was impossible to refuse admission. To provide beds, the improved and least ill of the special cases were taken out of the hospital and given bedding which, at night, they spread on the floors of the house. It was not ideal hospital management but a concession to urgent necessity, and even then, many had better accommodations than they would have had at home. At one time there were more sleeping in the house and outbuildings than in the hospital.

The hemoglobin was taken when patients had expelled all their uncinariæ and appeared to have regained their normal color. If it registered 85%, or over, they were considered cured of their uncinariasis, and were discharged. The first case thus discharged was on June 11th. The hemoglobin examinations were equivalent to handling that many additional patients, and as they became numerous, we were efficiently assisted in this labor by Mr. Octavio Jordan, of Utuado, a student at the Jefferson Medical College, Philadelphia.

During the last few days patients were told not to return as our dispensary would be closed. On August 15th, treatment of patients ceased, 4543 cases of uncinariasis and 6 of anemia from other causes, having been treated.

While at Utuado, Dr. Isaac Gonzalez Martinez, of Mayagüez, spent ten days working with the Commission and making a special study of cases of bilharziosis, a number of which we had encountered among our patients at that city.

Our camp at Utuado was visited by several prominent tourists and many of the higher officials of the Insular Government, among whom were Dr. José Gomez Brioso, Director of Health, Charities, and Correction; Dr. Francisco del Valle, Supervisor of Health; Hon. Pedro Juan Besosa, and Hon. Manuel Perez Aviles, Delegates to the Legislative Assembly, etc.

On July 24th, we were honored by a visit from the Governor of Porto Rico, Hon. Beekman Winthrop, who inspected the camp and workings of the Commission.

From August 15th to 19th, the camp effects were packed for storage, or shipment to San Juan. On leaving Utuado, we were much gratified to observe among the people of that city, that the former scepticism as to the curability of the disease by medicine, had given place to belief.

Through the kindness of Maj. W. F. Lippitt, Surgeon-in-charge, the Commission was provided with cool and commodious quarters in the Military Hospital in San Juan, and by September 1st, had begun the task of classifying and tabulating the immense mass of data, preliminary to writing the report. Two months were spent before this was accomplished, and the remainder of the time has been occupied in the formation of the report.

Having terminated its labor of investigation and formed its conclusions, the Commission thought it advisable to secure the opinions of the medical profession of the Island, respecting this affection, and sent out the following circular to all physicians.

San Juan, P. R., September 12, 1904.

Dr....................................

....

Dear Doctor:—

The Commissión for the Study and Treatment of Anemia in Porto Rico, about to terminate its labors, desires to secure the opinion of the medical profession of the Island about certain matters which pertain to the work. We intend to summarize the valuable results of the investigation and experience of our brethren who have had opportunity to know a disease generalized in the rural population of Porto Rico, and whose data will have for this Commission the inestimable value of being given by those who, really interested in the conquests of our science, strive for the social betterment of this country. And, believing that you, interested like us all in this most important question, will lend your aid, we include herewith a list of questions, which you may amplify as you think pertinent, begging that you will return your answer.

Thanking you in advance, we are.

Yours fraternally,

BAILEY K. ASHFORD, M. D.,
Captain, Assistant Surgeon, U. S. Army.

W. W. KING, M. D.,
Passed Assistant Surgeon,
U. S. Public Health and Marine-Hospital Service.

PEDRO GUTIERREZ IGARAVIDEZ, M. D.,
Health Officer of Bayamon, and Director of Municipal Hospital.

QUESTIONS.

1.—What, in your judgement, is the principal cause of the anemia from which the rural population in Porto Rico suffer?

2.—Do you believe that the nematode, "uncinaria americana" or "uncinaria duodenalis" exists in Porto Rico, and have you information as to its prevalence?

> 3.—Do you believe that this intestinal parasite produces anemia?
>
> 4.—Supposing that the uncinaria causes anemia and is prevalent in the Island, do you believe it can be the cause of the anemia of the Porto Rican peasant?
>
> 5.—Have you had cases of uncinariasis under your observation, in which you have used thymol or other drugs for the expulsion of the parasite?
>
> If so, please state, what drug you used, mode of administration, number of times in each case, and what result was obtained by your treatment.
>
> Although the preceding questions refer only to clinical experience, the Commission will greatly appreciate the reports of those who have carried out their investigations in laboratories.

Of the 169 circulars sent out, 122 were ignored for some reason other. We are loath to think that it was from lack of interest. W desire to thank all those who have so courteously given their fra opinions on this subject, so eminently pertinent to the medical frate nity of the Island. The answers to each question may be tabulated follows:—

1.—23 gave the uncinaria; 16 gave poor food, lack of hygiene, climate, or other causes of this class, either singly or in combination; 6 combined the two above classes in more or less equal importance; 2 were non-committal.

2.—One negative, others affirmative.

3.—All affirmative except 3 who denied its power for harm except in association with other causes or predisposing conditions.

4.—37 affirmative; many properly qualifying their answers by reference, in varying degree, to other causes; 8 apparently attached about equal or more importance to causes other than the uncinaria; 2 were non-committal.

5.—36 used thymol in one or more cases, even though some did not mention the uncinaria as the chief causal factor; 1 used filix mas; 10 had no personal experience. With scarcely an exception, the results were satisfactory.

The Commission, basing its opinions upon the result of its inves igations which form the body of this report, has drawn the followin conclusions:—

The disease known as "anemia" in Porto Rico is only a symptom of some definite pathologic entity, or a consequence of some aberration of physiologic processes, caused by improper diet, unhygienic surroundings, etc.

The finding of a specific disease which produces anemia and the disappearance of this symptom under treatment directed to the disease alone, while the general causes remain unmodified, lead us to believe that the anemia in Porto Rico is due, in the great majority of instances, to this specific disease, i. e. uncinariasis, or ankylostomiasis.

As is well known, this affection is caused by the presence of a small worm (uncinaria) in the intestines of the patient.

This parasitic worm gains entrance to the subject, generally by penetration of the larva through the skin.

The disease is marked by profound anemia and degeneration of vital organs, leading to chronic invalidism, and often results in death.

About 90% of the rural population in all parts of the Island are affected.

The large number of sufferers must affect the social and economic status of the country.

The affection is curable in the great majority of cases, and is susceptible to restriction or elimination in proportion to the observance of elementary hygienic laws and the treatment and cure of those already afflicted.

The few cases in which anemia is symptomatic of other disease or condition are the same as in other countries and are produced by the same causes. As exceptions to the rule, they tend to strengthen our conclusion that the prevalent anemia in Porto Rico is a consequence of uncinarial infection.

The Surgeons-General of the Army and of the Public Health and Marine-Hospital Service have forwarded our labors in every way possible, not only in detailing their officers for this duty but in placing instruments and recent literature at our disposal.

Acknowledgement is due the following for their assistance, material or professional, rendered to the Commission: Governor Beekman Winthrop, Ex-Governor Wm. H. Hunt, Secretary Régis H. Post, Ex-Secretary Charles Hartzell, and Mr. Scott Truxtun, of the Insular Government. Of the medical profession, Drs. W. F. Lippitt, Major, Surgeon U. S. A., José Lugo Viña, Assistant Surgeon, P. R. P. R. of I., Tulio Lopez Gaztambide, Agustin Stahl, Isaac Gonzalez Martinez, Rafael Cesteros, Santiago Veve, Fernando Nuñez, Antonio Guijarro, Rafael Gatell, Felipe Vizcarrondo, Francisco Hernandez, and Octavio Jordan.

Don Ramón Fernandez, Don José Tibot, Alcalde of Bayamon, Don Pedro Rivera Collazo, Alcalde of Utuado, and numerous other friends in those cities.

UNCINARIASIS.

DEFINITION.

A specific infectious disease of tropical and subtropical climates, and of favorable localities in the temperate zone, occurring in individuals who come in intimate contact with damp earth or muddy water containing the larvæ of uncinaria duodenalis or uncinaria americana; characterized by an insidious progressive anemia, weakness, various nervous and digestive disturbances; generally capable of cure on removal of the parasites; and capable of prevention by a proper disposal of human excrement.

TERMINOLOGY.

Anchylostomiasis, ankylostomiasis, dochmiosis, hookworm disease, Egyptian chlorosis, tropical chlorosis, AAA and UHA disease (Egyptians, 1550, B. C.) cachexie africaine, rihagán ("the yellows", Sandwith), brick-maker's anemia, tunnel anemia, St. Gothard tunnel disease, tunnel disease, miner's anemia, miner's cachexia, dirt eating, negro consumption, mal d' estomac, malnutrition, malarial anemia, pica, opilaçao, anemia of Ceylon, anémie des pays chauds, hypæmia intertropicalis, geophagia, allotriophagia, mal-de-cœur, cachexie aqueuse, amarellão, cançãçao, tun-tun, beri-beri, Porto Rican anemia (Stiles).

Under these names, cited by Stiles, Manson, and Scheube (some by each one of them) as having been applied to it, the disease has been described in times past. Many of them were due to errors in diagnosis, such as beri-beri, which does not resemble it.

Today the proper name is one of two, ankylostomiasis or uncinariasis.

HISTORY.

Uncinariasis has a definite modern history founded upon the investigations of students of medicine of our time, and one of presumptive character, based on accounts of an analogous disease of times far more remote forming evidence more or less satisfactory, according to the credence we may care to give to authors who merely draw us a clinical picture without identifying the parasite, later discovered by Dubini.

KNOWLEDGE OF THE DISEASE PREVIOUS TO 1838.

The most ancient reference, thought by Joachim to bear upon our subject, is found in the Ebers papyrus, written by the Egyptians in 1550, B.C. Here is described a disease clinically similar to uncinariasis, and which they assigned to intestinal worms.

Piso, in Brazil, in 1648, Padre Labat, in Guadeloupe, in 1748, Chevalier, in Santo Domingo, in 1752, and Leracher, Dazille, and Bason in the Antilles, all portray a clinically identical affection. Bryon Edwards in Jamaica, in 1799, cites great mortality among prisoners from what was, in all likelihood, uncinariasis. In 1802, a similar disease in the mines of Valenciennes and Anzin, was designated "anemia montana" and ascribed to lack of light and fresh air. In 1833, Mr. Hamont, living in Egypt, is found ridiculing the French physicians there who were trying to cure anemia by placing twelve leeches on the abdomen.

In summing up a meagre early history we may surmise that the disease came originally from Africa. Before 1838, all writers on what we now recognize as uncinariasis, evidenced their belief in its entity as a disease by giving it a distinctive name which was sometimes chosen from among its characteristic symptoms as "opilaçao" (Piso), or from a prominent factor in what they considered its etiology, as "miners' anemia."

HISTORY OF UNCINARIASIS FROM 1838 TO 1879.

The true scientific foundation of our knowledge of the disease rests on a remarkable paper appearing in an Italian medical journal in 1843. Here in a short and quaintly worded article by Angelo Dubini, a physician of Milan, is a description of what, to him, was apparently only a new and curious parasite with no very definite danger to its host. In May 1838, while performing an autopsy upon a "contadina" of Milan, "dead of pulmonary hepatization," he stumbled upon a little worm in the small intestine, with its head buried in a gray patch in the mucous membrane. The presence of the parasite in the duodenum seems to have made a profound impression on the discoverer, and, although he cites the fact that there was a greater number in the jejunum, he gave his worm the name of agchylostoma duodenale. He contents himself with remarking that perhaps these parasites contribute to the production of chronic diarrhea.

In 1845, Siebold classified the new parasite, but almost all medical authors, and practically all zoologists, lament the inappropriateness of the name given. Stiles, an authority in the United States in zoology, states that uncinaria duodenalis is the proper name, as uncinaria, (Frolich, 1789) holds priority, and thus the worm is known among American writers.

The year following Dubini's article, the parasite was found by Castaglioni in Milan. Pruner in Egypt, in 1840, found it at autopsy in "cachectic, dropsical, and scrofulous" persons. Bilharz and Griesinger found it at nearly every autopsy, and the latter was the first to declare that the worm caused the disease which, he said, affected one-fourth of the population of Egypt.

Wucherer, in Brazil, in 1866, awakened by the great work of Griesinger, now produced some valuable literature relative to its prevalence in that country, but, outside of Rio Janeiro and Bahia, there was much incredulity.

A serious study was begun in Italy. Sangalli, in 1866, autopsied various cases but denied a hematophagic rôle to the parasite. Grassi, in 1877, was apparently the first to recognize in the feces the typical ovum of the uncinaria. He insisted upon the blood-sucking character of the worm and the resulting grave consequences dependent thereon.

HISTORY OF UNCINARIASIS FROM 1879.

The year 1879 was destined to proclaim to the world the possibilities for death latent in the tiny worm of 1843, and the conversion of the European medical profession really began when the great St. Gothard tunnel epidemic was explained. Fortunately this feat of engineering was attracting the curious attention of all civilized nations, and the fate of the thousands of laborers could not fail to excite a lively interest and initiate professional research. In the year named, hundreds began to sicken among these workingmen. At first, no one seemed able to either assign a cause for, nor cope with the disease. In February 1880, 1,500 uncinariæ were found by Colomiatti, in the intestines of a man from the tunnel, who had died in the hospital in Turin. Perroncito, Bozzolo, and others began to investigate, and to these first two is generally accredited the crusade against the epidemic which was found to be solely uncinariasis.

The knowledge of the character of the tunnel anemia began to be applied to a similar anemia in mines and brick-yards in Europe, which, heretofore, had always been ascribed to faulty ventilation, lack of sunlight, etc. Elaborate chemical fancies had been cited to prove the potency of these etiologic factors and, even as late as 1885, Manuvrier was decorated for a thesis in which the miner's anemia of France was so explained. The mines of Valenciennes, Anzin, and St. Etienne in France were now shown to be infected with the uncinaria duodenalis; the Chemnitz mine in Hungary, the mines of Sardinia, and many others also gave up the secret of their fatal anemia. Menche found an endemic of uncinariasis among the brick-workers in Bonn, who had had no connection with the St. Gothard tunnel. A few weeks thereafter, Leichtenstern, a pioneer of scientific research in uncinariasis, studied the disease in the brick-workers of Cologne. In Belgium, Masius, Francotte, Firket, and von Beneden declared it to be endemic in the Mons coal fields.

Thus, little by little, the industrial centers of Europe were proven to be heavily infected, and the medical profession began to take the worm more seriously. Still, up to some time between 1895 and 1900, there was considerable discussion and doubt as to the power of "anchylostoma duodenale" to produce serious anemia. Since the year 1900 and even since the year 1898, civilized nations have been startled into a relentless war on the parasite, realizing its menace not only to the health of their working classes but to their economic and social status. It is necessary to recount the efforts of a few of these nations to rid themselves of the disease, in order to comprehend the extent of the crusade and the means adopted for its successful outcome. Not only is this a serious question for the medical profession, but there is not a first-class European government, today, which is not alarmed at the situation, and which is not combating or preparing to combat the danger. Uncinariasis is a disease of tropical and subtropical countries, with endemic foci in the temperate zones wherever the conditions needful to a favorable culture medium for the parasite exists.

A few preliminary remarks will aid us in a better classification of our knowledge of the geographical distribution of the parasite.

1. The great lurking places of the uncinaria hominis are not fully exploited. In spite of an abundant literature, physicians are not yet acquainted with it, and many excellent practicioners are ignorant of all save one of the popular names of the disease and possibly a few clinical facts to identify it. In certain civilized tropical and subtropical countries, the same may be said with far less excuse.

2. There are countries where the disease is endemic among classes following certain pursuits, and where there is little danger of extensive spread. Such, for example, are Germany, Belgium, and France. As countries said to be infected, they cannot be placed in the same category with Porto Rico and other parts where uncinariasis is the scourge of scourges and is as fatal, if not more so, than yellow fever in its palmiest days.

3. There are regions said to be infected because a few straggling cases have been reported, but such cases are really imported into climates where neither occupation nor temperature will ever favor a spread of the disease.

4. Finally, there are places presenting favorable conditions for the development of this parasite, and which, by analogy, medical geographers have considered infected, but the parasite has not yet been demonstrated, and the clinical data are merely suggestive.

THE UNITED STATES.

Our country has made two strides in the direction of governmental work upon this disease. The first was the detail of Dr. Charles Wardell Stiles, Zoologist of the U. S. Public Health and Marine-Hospital Service, to determine the frequency and distribution of uncinariasis in the Southern States. He found that it is prevalent and that such popular diagnoses as "pale skin", "heart disease", "bloat", and "malaria cachexia" must undergo a radical change.

The second was the very substantial aid rendered by the Federal Government to the work initiated in Porto Rico in February of this year.

Individual study in the United States has been so general of late that to mention one would be to omit many others equally valuable.

EUROPE.

Here, as Tenholt says in his earnest address before the International Congress of Brussels in 1903, the disease is the burning question of the day; it is the miner's bugaboo. It is found in mines and tunnels wherever the exotic worm finds the proper temperature, humidity, etc. As in the tropics, the filthy custom of soil pollution is responsible for a menace to one of the richest industries of the great powers. We are, therefore, not to be surprised that, although restricted to a few localities, it is the subject of governmental concern and is costing enormous sums of money to eradicate.

While practically all the states of Europe are engaged in a sanitary reform of their mines, due to the spread of uncinariasis, we have only space for a resumé of the work in the principal ones, as Germany, Belgium, and England.

GERMANY.

Since 1838, many parts of Germany have been from time to time declared infected. When, however, in 1886, Albers in Essen, and Löbker, in Dortmund, in 1895, reported a widely spread infection in the Westphalia mining districts, genuine terror spread throughout the workmen, culminating in the masterful attack now being made against the parasite in that locality.

The Westphalia mines employ about 256,000 men. The crusade was begun in 1895–96, when a rapid search for anemic miners was made, taking the color of the mucous membranes as a guide. All such were sent to Bochum where, at the hospital, they were examined for ova of uncinaria, and treated. This hospital was soon overpowered by force of numbers.

Table 1.—The following figures show the number of sick from 1896 to 1902:

1896.— 107 cases or 6.4 per 10,000 men in 16 mines.
1897.— 113 " " 6.2 " " " " 32 "

1898.— 99 cases or 4.9 per 10,000 men in 24 mines.
1899.— 94 " " 4.4 " " " " 27 "
1900.— 275 " " 11.7 " " " " 42 "
1901.—1,030 " " 40.6 " " " " 65 "
1902.—1,355 " " 52.9 " " " " 69 "
(The latter year only includes October.)

In 1900, the mines began to be watered to avoid coal dust explosions, and to the increased humidity is ascribed the rapid rise in the number affected.

In 1896 and 1899, conferences between the General Administration of Mines at Dortmund and physicians, resulted in a very general use of portable latrines in all mines. As, in spite of these measures, the disease was increasing to an alarming extent, the bacteriological laboratory of Gelsenkirchen was appealed to, and Bruns, Tenholt, and Löbker met in medical council, unanimously adopting the following resolutions:

1.—That no man should be engaged for work in the mines until he should be proven free from infection.

2.—That a thorough search be made for *all* infected in the mines.

3.—That all infected should be eliminated from the mines until they should be proven free from infection.

4.—That microscopic examinations of feces should be conducted at the mine proper.

5.—That one of the most heavily infected mines should be taken thoroughly in hand with a view of determining the most feasible method of eradicating the parasite.

A hard fight ensued to secure the adoption of these resolutions by the interested mine-owners, in which the medical council won.

Simple pavilion hospitals were erected at various mines and the enormous task of examining men was begun. The infection was found to be very heavy, and the Minister of Commerce, representing the government, upheld the sanitary ordinances enunciated by the medical council and gave orders to the sanitary police to see that they were carried out. This was begun in August and September of 1903 when all mines were required to have, at least, 20% of their men examined, and a report of the result made to the General Administration at Dortmund. In October 1903, the orders, placed in the hands of the police, required every mine-owner to have his entire force examined, and thereafter render a weekly report of the result of examination of, at least, 200 men, to the General Administration of Mines. Moreover, every man who had been reported infected, was considered infected until three successive examinations of his feces failed to reveal ova of uncinaria. These orders were additions to those contained in the first set still in force. The pail system of latrines, in a ratio of one to every four men, was placed in rigid force. No disinfectant was adopted for the mines as Bruns' experiments proved this measure utterly impracticable. The united opinion of the medical council was, that, if the disease should spread, it would impoverish the richest part of Germany, a deduction made from the terrible example of the St. Gothard tunnel epidemic and from the report of Löbker on the epidemic in the Austrian mines of Brennberg, where 85% of the miners were seriously sick, and the operation of the mines threatened with suspension for lack of hands to work them.

Bruns states that, with all the money at their disposal, the problem was no less than to keep the feces of 180,000 men under constant microscopic surveillance. The financial strain began to be seriously felt by miner and mine-owner. Often, feeling perfectly well, the men were obliged to submit themselves to treatment, and this represented a loss of wages. Thanks to reimbursement of the miners for time lost in treatment and to the counsel of wiser heads among the men themselves, a strike was averted. The Minister of Commerce, in his annual report for 1903, refers to the expenditure of 3,000,000 marks in addition to the large sums contributed by the workmen and owners, and states that never before was a war waged with such force and enthusiasm, on an infectious disease.

In April, May, and June, 1903, 17,161 out of 188,730 miners were found to be infected.

The following statistics refer to the percentage of men, at different collieries, found infected at the various examinations, and show how the conditions improved under the system of prophylaxis employed.

Table 2.—

Graf Schwerin:	66.1 %	at	first	examination;	44.2 %	at	second.
König Ludwig:	38.7 %	"	"	"	10.8 %	"	fourth.
Graf Moltke:	7. %	"	"	"	.3 %	"	third.
Dannenbaum:	18.8 %	"	"	"	5.6 %	"	fifth.
Hannibal:	38.5 %	"	"	"	13.1 %	"	fourth.
Shamrock:	33.4 %	"	"	"	9.78%	"	"
Julia:	19.5 %	"	"	"	.9 %	"	seventh.
Von der Heydt:	17.9 %	"	"	"	2.1 %	"	sixth.
Pluto:	7.72%	"	"	"	.5 %	"	fourth.
Erin:	80. %	"	"	"	11.1 %	"	– –

These are only a few collieries but are examples of the general diminution of infection.

During the period, January 1, 1903—October 15, 1903, 21,612 men were treated, of whom only 6.8% showed anemia. Eighty-six mines received more than one general examination of the 70,000 miners there employed. Of these, seventy-four mines had two, three, or four examinations, and the remaining twelve had five, six, or seven. On the 15th of February, 1904, it was found that the total number infected in these mines had fallen from 13,621 to 3,663, a decrease of 73% in nine months work.

Bruns calls attention to the fact that treatment of all infected miners was practically the only means of prophylaxis upon which success depended, and he adds that the fight will be kept up until the disease is exterminated. They did, however, circulate popular literature on the subject and gave lectures to the miners, using every effort to thoroughly explain the conditions of affairs and dangers by which the men were beset.

The above facts are cited to show how great a success may be assured in sanitary reform, where a wise government, an intelligent people, and a noble and brilliant corps of physicians put forth their strength and demonstrate their patience.

BELGIUM.

The work here is centered in Liége but there does not seem to be so much popular and governmental concern for the future as in Westphalia. Practical reform began when the secretary of one of the provident socialistic organizations in the Liége district, noticed that claims for sick pay were particularly frequent in the case of men working at certain pits, and, on account of this, Professor Malvoz, of the Bacteriological Institute at Liége, was consulted. The outcome was the unearthing of a great endemic of uncinariasis, sporadic prophecies of which had, in times past, been enunciated by various observers. In 1899, the Belgian government appointed three Commissions to study and treat the disease, one for Liége, one for Charleroi, and one for Mons. At the International Congress of Miners, in 1903, it was stated that 10,000 miners around Liége were infected, and the inroads of the disease had produced such an effect on their sick funds that local friendly societies have refused admission to membership to men working at heavily infected mines.

A free hospital, established by Dr. Malvoz and under the charge of Dr. Lambinet, has 15 beds exclusively for the treatment of uncinariasis. Here, between May and November, 1903, the date on which our information was received, there had been treated 630 miners, 150 of them in the hospital, at a cost of about £280 to the end of the current year.

The pail system of latrines has been advocated and was put in service, but, at the Colard pit, Seraing, where 75% of the men are infected, the miners refuse to use them. Here is a hospital accommodating 80 to 150 patients per month, each dose of medicine costing 4 s. 10 d.

In the Esperance-Bonn-Fortune colliery, Montegnée, and in Mons, much active prophylaxis is being consummated with favorable results. Popular literature on the subject is abundantly furnished the miners.

ENGLAND.

Haldane announced in a report to the Home Secretary, in 1903, concerning anemia which he had been detailed to investigate in the Dolcoath mine in Cornwall, that the condition was wholly due to uncinariasis and not to defective ventilation, etc. as was previously supposed. Haldane and Boycott later published a most excellent article on the disease as observed by them in this locality. They state that the infection is of about eight years standing but was not recognized. Their prophylactic measures are practically the same as in Westphalia.

Of 63,000 miners, 12,157 were found to be infected, or 19.3%, a higher percentage than in German mines. By December, 1903, this number was reduced to 4,819 or 7.6%, although in most of the pits but one examination and round of treatment for those infected was practiced. Here again is a wonderful testimony to an intelligent interest in practical hygiene. They refer to the extraordinary ignorance of the disease, so long known yet so poorly understood in times past, and cite the epidemics in Cornwall and the southern part of the United States as examples, although Hirsch declared, in 1881, that it must be prevalent in our country, judging from the clinical histories published by American physicians. It seems that all civilized countries of today stand accused on practically the same grounds, for we find many well-known men of Europe explaining "miner's anemia" by obstruse theories at about this very time.

FRANCE.

In this country, the work, so far, has been almost wholly done by medical men, although the government has appointed commissions of investigation for Loire on which Calmette and Breton, of the Pasteur Institute of Lille, served.

The chief fear now seems to be for the Nord and Pas-de-Calais coal fields where 80,000 men are working, and 2% are infected. It is said that a motion will soon be laid before the Chamber of Deputies, by one of the labor members, to enlist government aid in fighting the parasite.

AUSTRIA.

The epidemic in Brennberg has been controlled by Dr. Goldman to such an extent that, from 85% sick of uncinariasis in 1896, the low figure of 8% of infected has been reached.

Dr. Emerich Töth states that, by simply turning all attention toward preventing earth pollution, they were able to eliminate the disease, twenty years ago, from the Selmeczbánya and Körmöczbánya mines where, previously, the disease made great havoc. He states that the wages of the men have increased 60% as a result of the fall in the sick- and death-rates which formerly cost so much for sick pay and pensions.

SOUTH AMERICA.

The literature considers uncinariasis prevalent in nearly all the tropical South-American and Central-American states. Many letters from these countries to this Commission attest to the accuracy of the published accounts of its prevalence. From Brazil, Lutz wrote one of the most beautiful clinical treatises extant on the disease. There is, however, much complaint that sufficient interest is lacking in these countries.

In British Guiana, Ozzard records its extreme prevalence.

Thus it seems that the mighty undertaking of our country, in Panama, will have yet to take into account this tiny but powerful enemy.

THE ANTILLES.

From the earliest times in the history of uncinariasis, writers have declared the presence of a peculiar and distinctive anemia in these islands. So suspicious have these reports been, that European writers have justly considered all of them infected, although in many of them, as in Porto Rico, no one had definitely demonstrated the parasite until 1899.

No attempt has been made by the Commission to give the geographical distribution of uncinariasis, but in nearly all tropical countries, it may be found. Notable among many are India, Egypt, Japan, Italy, and Spain.

ETIOLOGY.

THE PARASITE.

We do not propose to make more than a passing reference to the zoology of this nematode. For a complete description, we refer you to the works of Stiles, Loos, Perroncito, Leichtenstern, and others.

Order, Nematodes; Family, Strongylidæ; Sub-Family, Strongylinæ; Genus, Uncinaria; Species, Uncinaria duodenalis and Uncinaria americana (Stiles). These two species are the determining cause, in man, of a profound anemia which, with other symptoms, characterize the disease "uncinariasis," or "ankylostomiasis." There are many other species of the genus uncinaria which affect various animals, all differing in some zoological feature, yet all are "blood-suckers of the worst type and cause trouble wherever found." (Stiles.) This author states that fatal epidemics due to uncinariæ occur in sheep, dogs, foxes, and, notably, in seal pups in Alaska where 17% of all pups die from this cause. So far as known, none of the species from other animals affect man and, save in the chimpanzee, gibbon, and gorilla, no animal is affected by uncinaria hominis. Between uncinaria duodenalis, or "the old world species," and uncinaria americana, or the "new world species," so denominated by Stiles, there exist important differences. The American species has apparently a slightly smaller size than the European, [U. Americana; male, 7 to 9 mm.; female, 9 to 11 mm. in length (Stiles); U. duodenalis; male, 7 to 11 .2; female, 7 to 16 .5 mm (Leichtenstern)]. The sexes are distinct and possess elaborate organs of generation.

The head is bent backward giving the worm a hook-like appearance. The distinguishing feature of this class of animal parasites is the flaring umbrella-like caudal extremity of the male, from the bottom of which proceed two barbed spicules, the penis being found in the depths of the bursa. The caudal end of the female is conical.

The differences between the two species lie, chiefly, in the nature of the buccal armature, and in the size of the ova. Uncinaria duodenalis has a heavily armed mouth bearing two pair of ventral teeth, curved like hooks, and one pair of dorsal teeth. The ova measure 52 to 60 by 32 micro-millimeters.

Uncinaria americana has, instead of the two pair of ventral hooks, a pair of ventral semi-lunar plates or lips, and a pair of dorsal plates of the same nature. A dorsal conical median tooth projects into the buccal cavity, and, deep in the capsule, are found one pair of dorsal and one pair of ventral submedian lancets. In addition, there are differences in the arrangement of the caudal rays. The ova measure 64 to 76 by 36 to 40 micro-millimeters.

Macroscopically, the worms are seen, in the feces, as little threads, .75 to 1.5 cm. or more in length, white, gray, yellow, or blood-red, according to the contents of their intestines and genital organs. Our experience is, that males are a dead white, and females, white at the extremities, and gray in the middle half of the body, due to a uterus stuffed with ova.

DEVELOPMENT.

The ovum, deposited on earth, hatches out in about twenty-four hours under favorable conditions of humidity, temperature, shade, etc.

It must here be categorically emphasized that every ovum produces but one worm, if it hatches out, which it sometimes does not do; that this *never* takes place in the body of man; that, in other words, every ovum laid must pass on to its full development, as an encapsuled larva, outside of the human body. This means, of course, that multiplication of uncinariæ contained in an infected individual is impossible, and that, if a man has one hundred such parasites, he will never have any more until he is infected from without. This is the most important and the saving clause in the prevention and treatment of the affection, and is in sharp contrast to other infectious diseases commonly known.

From the time the embryo breaks its shell until it arrives at full sexual maturity, it "casts its skin" four or five times. After the fifth day, its second ecdysis begins and it arrives at the stage known as that of encystation. This is the infective stage and the larva ceases to develop further until introduced into the body of man. The encysted larva (infective form) has an approximate length of .65 millimeters by a breadth of 25 to 27 micro-millimeters. Thus it is less than one-tenth its adult size. It reaches full development in from four to six weeks after infection (Leichtenstern). Ten to twenty drops of water can hold about 1000 encapsuled larvæ.

Leichtenstern, Perroncito, and others and, latterly, Loos, Lambinet, and Bruns have made extensive culture studies on this worm. Bruns' experiments and deductions are most interesting. They may be taken as a model of care and exactness, and embrace all the essential points covered by the others, together with some new facts previously unknown. From them we may safely evolve practical prophylactic measures. One of this commission cultivated the worm in sand and garden earth in New York, and another made cultures in earth taken from various barrios in Utuado. Our conclusions are not yet drawn as to differences in soil affecting development.

Temperature. The best temperature for the cultivation of larvæ from the ova lies between 25° and 30° Celsius, but some are always unfruitful. At a temperature of from 27° to 31° Cel. the larvæ live perfectly well for at least six months outside of the human body. Bruns says that at the expiration of that time he accidentally left the cover off his culture dish, the water evaporated, and the drying was fatal to all larvæ therein. At a temperature between 20.2° and 20.8° Cel. it took 18 days to bring them to the stage of encystation. Some of them emerged from their shells in from four to five days. Experimenting in the open summer air of Germany he made a successful culture. After more than 48 hours in an ice box, the ovum did not develop, and freezing killed larvæ in one hour. Twenty minutes exposure at 50° Cel. also killed them and on exposure to a temperature of between 50° and 60° Cel., they died immediately.

Oxygen. This is a necessary element for the development of the ovum as anærobic cultures gave negative results after three weeks. Larvæ under anærobic conditions all died in three days, and it was noticed that the younger the larvæ the more rapidly death took place. It is clear, therefore, why, apart from other conditions, feces are not a good medium. Here rapid fermentation consumes much oxygen and even if the ova develop, the embryos soon die. This is amply attested by the death of larvæ in portable latrines, and feces so disposed of would not seem to constitute a danger.

Light. Ova exposed to direct sunlight die and begin to decompose in three days. To prove this, Bruns afterward tried to develop these same ova but, after eight days in the incubator, they failed to show signs of life. Very young larvæ, before they had reached the infective stage, subjected to direct sunlight, were killed in two days. Encysted larvæ seemed to resist well.

Water. 1.—In undiluted feces, the larvæ appeared in four days but, in ten days, all were dead, none having reached the encysted stage.

2.—In equal parts of water and feces, the ova hatched in four days, and encapsuled larvæ were found moving about in ten days.

3.—In a mixture of one part feces to four of water, the larvæ were found encapsuled in six days.

4.—Any dilution from the last mentioned up to 1: 500 gave encapsuled larvæ in four days.

5.—Dilutions of from 1: 1000 to 1: 2000 killed the larvæ and prevented the ova from developing after six days.

6.—His best cultures seemed to result from a dilution of from 1: 10 to 1: 100.

Bruns explains the death of the animal in feces, apart from the lack of oxygen, by referring to the large amount of hydroscopic salts in excrement, which kills the parasites by abstraction from them of the necessary amount of water.

To satisfy himself that this was so, he killed ova in about ten minutes in concentrated salt solution. He states that there is a "plasmolysis" under such circumstances. He found that, when feces contain but from 50 to 60% dry matter, the ova shortly died but encapsuled larvæ are more resistant.

Chemicals. After months of experimentation with every sort of chemical disinfectant, Bruns concludes that none has yet been found to kill the encapsuled larvæ so surely that it can be practically used. This statement is all the more convincing when we consider that, in the laboratory, direct contact of chemicals with the larvæ was assured. He states that the substances which abstract water were more successful than mere poisons. Lambinet (Bull. Acad. Roy. de Medicin de Belgique (4) XV- 1901, p. 397) found that immersion in a 2 per cent corrosive sublimate solution, and in a 3 per cent lysol solution for one hour failed to kill the ovum, while glycerine or a strong solution of salt was fatal. The larvæ were not killed in a 2 % corrosive sublimate solution after an exposure of six hours, nor in a 25% sulphuric acid solution in three quarters of an hour.

Bruns concludes that we must abandon any hope of disinfection by chemicals:

1.—Because too great a quantity would have to be used at too great a cost.

2.—Because, even if supplied in enormous quantities, all larvæ would not be reached.

3.—Because such a concentration of chemicals, poisonous to the larvæ, might be fatal to men working in spots thus disinfected.

He tried ten times to disinfect parts of mines with milk of lime and never had any satisfactory results.

MODES OF INFECTION.

There are two modes of infection; one, and until recently the only one known, by the ingestion of larvæ; the other, still doubted by many, through penetration of the skin by the larvæ and their subsequent migration to their point of election, the small intestine.

Infection by ingestion of larvæ. Leichtenstern first clearly showed that infection *per os* is possible but, we think, erroneously considered this to be the usual mode. He found that in from five to six weeks the parasite became sexually mature, but fails to explain clearly how the little worm maintains its usual position in the jejunum until development is complete. Grassi believed that they encysted themselves on reaching their destination, a belief strengthened by Leuckhart, reasoning, by analogy, from the encystation of strongylus equinum in its host during its developmental stage.

As most authorities are agreed that this is at least a possible avenue of infection, let us call attention to some of the means by which our laboring classes might thus become infected.

It should be noted that all traces of human ordure have usually disappeared by the time infection takes place; thus man's natural disinclination to touch feces does not cause him to avoid infective material.

More than this, the larvæ are motile, and rains scatter them about, so that large nests of infection, as we may say, are dispersed over considerable area. We believe that we should emphasize the fact that it is usually in the immediate vicinity of his home, and even sometimes inside the hut, that the jibaro is infected. He defecates "en el montecito," or as we say, "in the bushes," and this montecito has become a synonym for latrine. Owing to weakness due to the disease itself or to indolence, his excursions to the montecito become shorter and shorter and result in a general pollution, by himself and his family, of a considerable area around his home.

A jibaro hut is usually well shaded by banana plants, so we have shade, humidity, which is practically never lacking in such spots, and an ideal temperature.

Another heavily infected locality is beneath the coffee plant; coffee picking is at times interrupted by a call to stool, which is obeyed in the immediate vicinity. The coffee bush itself produces shade, being always shaded in turn by some tree or variety of plantain. Thus we have in every coffee plantation in Porto Rico a mass of liberated larvæ. Next to the shade of banana plants, that afforded by a coffee estate admits no superior for an ideal culture medium. The quintessence of perfection is, however, only attained when a mass of decomposing banana leaves and stalks fall into a little depression in the dense shade. In a few days a rain comes on and a "charco", or little pool of water, forms. Certain "charcos" are popularly known and feared by the peons for reasons to which we will afterward refer.

Sugar fields are not nearly so heavily infected as coffee estates because of two circumstances. The earth is plowed up every year and the sun acts powerfully upon it after the crop is harvested. One suffocates many larvæ by turning them under a heavy layer of earth, the other kills them by direct light, heat, and drying.

We have been entirely convinced that the observation of Stiles, that sand areas were practically the only ones infected, cannot be substantiated here in Porto Rico. Sandy regions were not those which contributed the majority of our cases in Bayamon. On the contrary, the foothills were apparently the heavily infected parts. Bayamon, although near the sea, is not sandy. Cataño, a large settlement only an hour away, where every condition is afforded for a heavy infection of the inhabitants, did not furnish but 11 cases. On the other hand, very distant interior barrios contributed most of our patients. In order to determine the facts, we made a trip to Naranjito and other towns well elevated in the foothills, and were able to confirm our suspicions. Cataño, a purely sandy locality, is generally infected, but in the foothills, noted for a rich alluvial soil, the number of extreme cases of anemia is something beyond description and not to be compared with the cases seen in sandy barrios of the coast. Utuado is a sandy town but we received the majority of our patients from barrios which could in no wise be so described. We therefore conclude that sand is not proven to be any better culture medium than alluvial deposits and clay, soils common in districts where it is difficult to find one single person not infected with the uncinaria. This should not be taken to mean that sandy districts cannot be heavily scourged. All varieties of soil in Porto Rico can provide a good culture of larvæ if the infected feces are deposited under proper shade.

If we believe that infection takes place generally by ingestion of encapsuled larvæ, we only have to call to mind the manifold habits of life possessed by every people on earth who deal directly with the soil. Some of these may be specified as follows: Soiling the mouth with muddy hands at meal time; eating muddy vegetables and fruits; drinking muddy water; drinking from muddy receptacles; inadvertently swallowing muddy water while bathing in streams; earth eating; carrying muddy clothing home to soil the hands of wife and children; cleaning of muddy feet and transferring the infection to the finger nails; crawling of children in earth which they frequently eat; handling of mud-bedraggled dresses before meals; eating of sweets made in dirty, muddy houses; drinking of guarapo, the expressed juice of sugar cane. This list comprises by no means all of the possible modes of infection by the mouth.

The important point is, that, if infection by the mouth takes place, the mud ingested must be wet at the time. We have positive evidence from almost every observer who has cultivated the larvæ, and from our own culture experiments, that they die rapidly on drying.

If infection takes place by drinking muddy water, that water must be exceedingly repulsive to contain more than one part of solid matter to the thousand, a proportion shown by Bruns to be fatal to the larvæ.

In our opinion, infection by the mouth is so restricted by the latter facts as to be a rarity indeed. We know of many instances of infection in well-to-do persons where it is not probable to conclude an infection through the ingestion of either mud or water, and in which an explanation can only be made by the fact of skin infection.

What, then, is the common route chosen by these small larvæ?

Infection by penetration of the skin. In 1898, Looss, experimenting with cultures of larvæ of uncinaria duodenalis in Cairo, Egypt, accidentally found that mere contact of his hand with the culture produced a dermatitis. Finding ova later in his stools, he concluded that he must have infected himself through the skin, having lived six years in Cairo, where, in the city, uncinariasis is not endemic but rare, especially among the better classes. In 1901, he proved the correctness of his theory by experiments. These experiments were partially repeated by Grassi, Pieri, and Noe, in which Grassi spread three drops of infected water over his forearm, Pieri let eight drops remain on his hand till dry, and Noe, four. In seventy-one days, Pieri found himself infected, but the others were unable to find ova in their stools and all concluded that Pieri's infection must have accidentally occurred *per os.*

In 1902, van Durme proved the entrance of strongylus stercoralis through the skin of a guinea pig.

In the same year, Bentley described ground-itch as a dermatitis of tropical climates, affecting the feet of coolies and laborers in the English West Indies and Assam, India, and found a young uncinaria larva in a vesicle. Bentley did not say that the larvæ reached the intestines from an infected skin. Writing, however, in April, 1904, he says, of the possibility of the worm reaching the intestines after such infection: "Other writers have confirmed these facts and this mode of infection is now recognized generally as an alternative to the old theory of infection by the mouth. I do not think this latter occurs except in rare instances."

Boycott and Haldane state that "New Sump bunches" is a dermatitis of the body affecting miners in the infected mines of Cornwall. These workmen wear shoes but often work nearly or quite stripped to the waist. The authors identify the dermatitis as water-itch, described by Bentley, and state that, reviewing the experiments and clinical evidence of skin infection, they deduce that uncinarial infection may occur quite readily through the skin.

The dubious attitude preserved by the Italian workers, toward Loos' theory of skin infection, led the latter observer, in 1902, to repeat his investigations, and the outcome has presented the subject in such wise that we may say that skin infection by uncinaria larvæ has been amply demonstrated. His experiments were followed by those of Claude A. Smith, Professor of Bacteriology in the Atlanta College of Physicians and Surgeons.

Looss calls attention to the fact that Grassi, in his experiment by spreading the infected water on his arm, allowed it to evaporate before the larvæ had time to effect an entrance and that the rapid drying killed them. One of the objections, made by the Italian experimenters in concluding that Pieri became infected by the skin, is that the number of larvæ in eight drops of water was far greater than the number of worms expelled. Looss grimly remarks that much time will elapse before Dr. Pieri will hear the last of his infection, for the larvæ do not all reach the intestine at the same time. Some are more active than others, and the long distance to be traversed from the hand to the bowel is covered by the larvæ pushing their way through the tissues. Some must encounter obstacles that others do not and moreover, it is reasonable to suppose that some die en route. He states that he infected a guinea-pig by the skin, and 14 days afterward found the larvæ still alive but a short distance from the point of entrance, migrating in the tissues in a direction toward the intestines. He never found a larva in a lymphatic canal.

Proceeding to his second series of experiments, Looss infected a nurse, 26 years of age, who had been six years in Sandwith's hospital and who had not been outside of Cairo in that time. Repeated and thorough examinations of the feces for four weeks, revealed no previous infection by the uncinaria. Seven drops of heavily infected water were let fall on the man's wrist and this was shortly followed by the typical eruption. Next day, the whole arm swelled and much prickling was noted at the point of infection. In a week the swelling subsided. Looss began to search for ova in the feces four weeks afterward, once, and some times, twice a week. In seventy-one days, ova appeared, a few at first, and in about two months, six times as many. Mud is thought to be the most favorable mode of infection by the skin. The water experiments are liable to fail on account of rapid drying.

Looss now began to infect animals. He took a puppy three months old, clipped the hair from a space about twenty square centimeters on its back, wet the area and applied a thin layer of mud infected with anchylostoma caninum. He bandaged the puppy thoroughly to avoid its infecting itself by the mouth, and in two hours removed the bandages, cleansed the area, and scrubbed thoroughly for one minute with 96% alcohol. This killed the larvæ remaining on the surface and prevented mouth infection. Search in the removed mud revealed the fact that they were only one-sixth as frequent as before the application. Looss says that the dog explained later where the missing five-sixths were. He held the animal for three hours in his arms, during which it passed its time scratching. On the ninth day, it presented a perfect picture of acute uncinariasis and, on the tenth, died. At the autopsy, a careful search of the skin, subcutaneous tissue, and underlying muscle was made but no embryos were found. These tissues presented only an extreme bloodlessness. In the body cavities, all organs were found to be very anemic. Between 30 and 50 cm. below the pylorus of the stomach, were found dark points which showed through the gut before opening, and below this, the major part of the small intestine was of a dark red color from fusion of these points. On opening the intestine, the patches were found to be hemorrhagic infiltrations. An enormous number of young larvæ of uncinaria were found still encapsuled and lying in blood. The intestinal canals of twenty-four of these worms were searched and no blood was found in them. He infers that the anemia of uncinariasis is a question of toxins, and remarks that penetration of the skin occurs through the hair follicles, a wet hair being a guide to the larvæ. He infected two other puppies of the same age, one by the skin, and the other by the mouth through infected milk. One died of anemia in ten days, the other in eleven.

The brilliant experiments of Claude Smith corroborate these facts and prove that skin infection holds good also for the uncinaria americana. Smith bound soil, infected with four-day-old larvæ, upon the wrist of a man not previously infected, and allowed it to remain one hour. In eight minutes, the wrist began to itch, and on removing the soil, reddened macules were found. The next day, the papules were much raised and the wrist swollen. The following day, the patient reported that his sleep was much disturbed by the itching; the papules had become vesicles. The fourth morning, the swelling had extended to the fingers and inflamed streaks appeared above the wrist, running up the arm and tender on pressure. On the fifth day, the vesicles had become confluent, the itching had become less but the swelling had greatly increased, with enlarged and tender axillary glands. On the twelfth day, no signs of the dermatitis remained. On the eighth day, it should be noted that an attack of sore throat with febrile symptoms developed. From that time on, he began to complain of an uneasy feeling about the stomach, which continued to the end of the fourth week. At the middle of the seventh week, ova of uncinariæ appeared in the stools. He found experimentally that drops of infected water required thirty-five minutes to produce the typical stinging sensation, whereas with mud it was produced in eight minutes, and his conclusion is that mud, by offering a purchase for the parasite to push into the skin, affords a quicker and easier penetration.

He also infected the prepuce of a man who was about to be circumcised. In four minutes, the patient, who knew nothing of the experiment and who believed the application was preparatory to the operation, remarked that he felt as though a fly was crawling over the part. In a minute, he said that he felt as though his prepuce was being pricked by needles. The macules were found on removing the soil. The rapidity with which the parasites gain an entrance to the skin is shown by the fact that a bit of mud containing larvæ, was applied to the skin and in four minutes removed. None were then found in the mud but, under the low power, the skin was seen covered with them at the point where the mud had been placed.

We have reviewed somewhat in detail the experimental stage of our knowledge of skin infection and we see that it is brought to the point where it is no longer a theory but a proven fact. On first taking up our work in Bayamon, we discussed the necessity for experimental confirmation and decided that it was neither desirable nor necessary.

1. Because time did not permit us to neglect our practical clinical observation and treatment of cases to verify facts already demonstrated by the best of observers.

2. Because our clinical experience with this etiologic factor on a large scale, would supply the practical demonstration that the skin is the usual point of entrance of the parasite into the organism.

3. Because it would be very difficult to find a suitable subject not infected with uncinariæ, and, still more so, in this Island, to preclude the possibility of the objection that he had not become infected *per os* during the time needful to await results.

It is believed that it will always be impossible to rigidly exclude other routes of infection but we are also very positive of the fact, which further remarks will render all but certain, that infection by uncinaria hominis, in this Island, is generally contracted through penetration of the skin by the larvæ, and that, once having thus effected an entrance, they pursue a more or less direct course to the intestines, the point of election. This may seem strange to some but it is no more so than accepted phenomena of similar nature such as the migration of the embryo of trichina from the intestines to the muscles. It is certainly not as odd as the unexplained and weird pilgrimage of millions of embryos of filaria nocturna, into the peripheral blood during certain hours of the night. In fact, we are accustomed to such behavior in the life history of many animal parasites of man and animals.

As to the chances offered the larva for effecting a lodgement in his human host, the skin is by far the most exposed. We are really unable to account in any other way for some infections we have seen.

The conditions under which the jibaro lives will be again referred to, but suffice to say that uncinariasis in Porto Rico is a chronic disease with acute exacerbations occurring in the rainy season; that at this time most deaths occur from "anemia"; that the great sufferers from "anemia" are the unshod poor; that they themselves lay great stress upon the fact that "anemia" comes from the dampness of the soil which, they say, ascends through the soles of the bare feet and "chills the blood", causing "enfriamiento." We wish to specially emphasize this general observation of instinctive jibaro pathology, because, for all that they may say of improper and insufficient food, this word of explanation is almost always appended. The sharper ones accuse their annual dermatitis of being the cause of their infirmity.

We wish to observe further; that the coffee sections and damp shady localities in general are the most anemia-plagued spots in Porto Rico, and that, in such localities, mazamorra hardly spares anyone at any rainy season; that for every one who will give a history of probable mouth infection, a thousand will attest to attacks of mazamorra. We realize that many persons dislike to acknowledge the possibility of having introduced, even inadvertently, wet mud into their mouths, but many also do not care to recount an eruption of any kind, because it is considered a taint and, on the feet, an evidence of filth. We believe that, of the few who stated to us that they never had a skin eruption, many had had mazamorra and had forgotten it, which is unlikely, or would not confess to it, which is much more probable. In fact, among such of our patients whose station in life was far better than that of the poor jibaro, and who never work with the soil, mazamorra was almost always elicited in their previous history and ascribed to the paddling about on the edges of streams, incident to a country bath. In such cases, to attribute their infection to swallowing mud or muddy water would be in the face of strenuous denials by the patient, that such a thing could have been possible. We have frequently had cases of chronic uncinariasis in persons who always normally wear shoes, but who date their illness back to the "exposure" incident to the cyclone of August 1899 and its subsequent heavy rains. This means that, for perhaps the first time in their lives, these persons, always accustomed to live well, were exposed to the grumous mud and water following the hurricane and inundation, and thus became infected. We have no way of determining that, among the well-to-do classes, this was a common time of infection but we are almost positive of it in some cases, and have good reason to suspect it in others. What then shall we say of the huge army of country poor who frequently date their anemia from that period which gave, in the year following, the largest number of deaths yet known here from anemia, 12,000 and more? Here, poverty and suffering joined hands with disease to bring about a calamity.

That the deepening anemia in these country people at that time could not have resulted from poverty and distress *alone*, we know, although we have had ocular demonstration of the profound distress, general at that time. At the field hospital for the indigent poor of the Ponce district, the cases of anemia applying for admission, seen three weeks after the cyclone, were not anemics of three weeks nor of three months. We have no doubt that many were the subjects of an acute exacerbation of their chronic disease through reinfection at that time, for, in the days that followed, all the best food that could be bought was unsuccessful in reclaiming many cases. Let us turn our attention to a very few examples culled from many similar instances, and first invite special attention to cases 14, 19, 20, etc., of the 61 special cases at Utuado, and to cases 1 and 16 of the Bayamon series (see Appendix). A perusal of these will illustrate the point in question.

Case 51, general series, stated that, before the cyclone, she always wore shoes and never had anemia. Cases 400, 910, and 941, general series, had one attack of mazamorra, and shortly after fell ill of "anemia". Case 482, general series, was a "mayordomo", or superintendent, of a coffee estate, under treatment with us for uncinariasis. His hemoglobin reached 76%, July 8th, with the remark "no uncinaria ova" on three consecutive examinations a week apart, but shortly before this had another attack of mazamorra. On the first of August, despite two doses of thymol in this interval, his hemoglobin had fallen to 58% although, naturally, no ova could yet be found.

One of our most interesting cases is found in case 4,431: R. M.; 29 years of age; full-blooded negro. He was hired by us to cart the large ash cans, used for the reception of feces in the camp latrines, to the ground selected for burying their contents. His duties were to dig a hole, empty the cans, rinse them with milk of lime and replace them. He worked for sixteen days, and at the end of that time reported to us for treatment saying that, although he badly needed the money he was too ill to work any longer, for he was very weak, had severe lancinating pains in his stomach, and was "eaten up" by mazamorra. He stated that the gastralgia supervened on the eighth day after his dermatitis began, and explained that his disease had risen from his feet to his stomach and that that "hole in the ground" was responsible for the entire matter. We found that he had had mazamorra some years before but had never before been sick. He had many ova of uncinariæ in his stools, and his hemoglobin registered 15%. We conclude that his relative racial immunity was overcome by an enormous infection.

The last case to be cited is that of a soldier in the Porto Rican Regiment stationed in San Juan. He was admitted to hospital with severe mazamorra which he acquired cleaning some pits near Morro

Castle, barefooted. We were given permission by the Surgeon, Major Lippitt, to study the case, and the man was sent for some of the mud which he said was that from which he had contracted his dermatitis. Larvæ of uncinaria were found in abundance. Of the 947 cases at Bayamon, 284 were asked about mazamorra; 263 said that they had had it and 21 gave no history of attacks. Most of the cases at Utuado were questioned on this point. Of the 61 special cases, one gave a doubtful history of the affection, the rest positive. Of the 4,482 cases belonging to the general series, there were 86 who were not questioned on this point and 65 who stated that they had not had it.

Most of these who gave a history of mazamorra stated that they were victims of it "at every coffee crop," and some of them were completely incapacitated for work.

In all of 5,490 cases of uncinariasis, 749 were not questioned concerning mazamorra. Of the 4,741 who were, 4,654 stated that they had had it, a percentage of 98 +.

PREDISPOSING CAUSES.

There has been a long list of conditions which have been cited in the past as causes of "anemia" in the tropics. While their influence upon the blood is not lost sight of, it is well known that they have heretofore been considered, not only in Porto Rico, but in all tropical and subtropical countries, as the determining cause of the profound anemia which is but a symptom of the disease under consideration. An entire population, not only anemic, but suffering from a series of other symptoms which form a distinct clinical picture, and which, for this reason, have led medical observers, before uncinaria duodenale was discovered, to dignify by a separate and distinct name, can hardly be considered, in these days, to be the subjects of one infirmity caused by a thousand and one etiologic factors. No one today would venture to prove that tuberculosis could exist without the tubercle bacillus, and yet no one denies that bad food, hardship, and an unpropitious climate work destruction in the presence of this terrible infection. The days of "miasms" have gone, yet we know that a cabin in a swamp is generally malarious because it is a breeding place for anopheles mosquitoes. It is unfortunate that such explanations are needful, but, as so many are still inclined to lay the blame for a widespread endemic on a motley collection of predisposing causes and debilitating influences, which act in uncinariasis as they do in every other disease, we think it proper to give to the prominent ones their places in a tragedy which without Uncinaria would be Hamlet without Hamlet.

Food.—The question of insufficient and improper food as a cause, and to the majority, the chief cause, of anemia on the Island has previously so dwarfed all other considerations that, until recently, little thought was given to any other. The essential point is, does the protein element in the food of the Porto Rican jibaro suffice to keep him in physical well-being?

Of course, protein alone is entirely insufficient and carbohydrates and fats must be supplied. This is practically seen, as Gilman Thompson remarks, in his "Food and Dietetics", by the Eskimo, who eats enormous quantities of fat with his meat to enable him to resist the cold and fatigue of long sledge journeys. He is, however, no stronger than the Central-African negro whose proteid is chiefly of vegetable origin, assisted occasionally by fish and game. Both, however, have a proteid and carbohydrate constituent in their foods, although one derives it from animal, the other from vegetable sources. The Polynesian warrior is more ferocious on a diet of plantains than the Eskimo who eats nothing but fish, meat, and fats. The Japanese are essentially a rice-eating people with a small but potent amount of nitrogenous food. "The Mexican, whose supply of meat is scanty and of poor quality uses the native bean or 'frijole' at almost every meal, made into a stew with vegetables and perhaps shreds of sun dried beef" (M. A. Abel). The same might be said of many parts of South America.

Hutchinson says:

> "But vegetable foods possess not merely abundance of carbohydrates, they contain proteids and fats as well. Some members of the class, such as the pulses are particularly rich in the former; nuts in the latter; but of vegetable foods as a whole it may be said that they tend more than the animal foods to contain representatives of all the three groups of nutritive substances. In consideration of this fact, the vegetable kingdom must be pronounced a better source of human food supply than the animal, and, if one were confined in his selection of a dietary exclusively to one kingdom or the other, it would be wiser to patronize the miller and green grocer than the butcher and fish-monger, for it is undoubtedly possible to live on vegetable diet alone whereas it is difficult to live for any length of time on nothing but meat. The way for most people, however, is to avail themselves of the resources of both kingdoms."

The food of the Porto Rican jibaro embraces bananas, plantains, various tubers whose food value approaches that of the potato, "gandules," of the value of the pulses, rice, and beans. He can almost always cultivate corn but knows very little of preparing it for use as a food; codfish, though cheap, is an article which must be purchased, and many of these poor people cannot do so. Still, many more have it than is generally supposed. For example, in Utuado, the poorest district on the Island, we noted the presence or absence of meat fibres in the first two hundred specimens of feces examined. In 83 they were found. Of these 83 persons, 60 were profoundly anemic, 15 were moderately so, and 8 had slight or no anemia. It is not understood why fresh fish can not contribute to the protein element lacking in the food of the poor in Porto Rico, as it does in Japan, also a thickly populated country.

While not unmindful that many believe that even vegetable food is lacking in the interior, it is believed that this is an error. Vegetable food can be secured in amount necessary to sustain life. With few exceptions, it is only when a whole family is too sick from uncinariasis to work, that all food becomes scarce and starvation threatens. We know of innumerable cases where half-sick jibaros are supporting invalids too ill to do more than lie in one position all day. We do not intend to write a thesis on the food value of the vegetables of the Island but we desire to call attention to several articles somewhat despised for a supposed low nutritive value.

Varieties of bananas and plantains.

Table 3.—

	Banana flour.	Wheat flour.
Moisture	13.	13.8
Proteid	4.	7.9
Fat	.5	1.4
Carbohydrates	80.	76.4
Mineral matter	2.5	.5

(Hutchinson.)

Knight quotes M. Humboldt who states that 33 lbs. of wheat and 99 lbs. of potatoes require the same space as that in which 4,000 lbs. of bananas are grown, and remarks on the smallness of the spots under cultivation around a cabin which contains a numerous family of Indians.

Hutchinson says: "It is evident from this that we possess in the banana a potential source of cheap nourishment which may one day be of great importance."

Surgeon Parke, ("My Personal Experience in Equatorial Africa," p. 416), in an account of The Emin Pasha Relief Expedition refers to Mr. Stanley, who was at the time suffering from acute gastritis, as follows: "He eats porridge made with banana flour and milk. It is very light and digestible * * * and is also very nutritious. We whites have very good reason to know this fact now as we have mostly lived on banana flour for the past two years." Long marches and frequent attacks of malarial fever, from which they suffered, were severe tests of the nutritive qualities of any dietary.

Banana flour can be easily prepared and is vastly superior to any other preparation of the fruit. We have had our attention called to the variability in the nutritive value of different members of the banana family but we possess no data to prove that it would materially alter our general conclusions. We have already spoken of the high proteid value of the pulses, of which the bean and "gandul" are excellent illustrations. To mention the famous "iron ration" of the Germans in the Franco-Prussian war, is to evidence the esteem in which this vegetable proteid is held. "Erbswurst," as it is called, is a mixture of pea meal, salt, and fat, and its modifications generally form part of every military emergency ration.

Corn: In the south of the United States, this much prized food forms the staple diet of many poor people. It contains about 9% fat, a component which the jibaro lacks. It is best eaten as cornmeal, but here, the "hoe cake" seems not to be generalized. It contains as much proteid as wheaten flour, if not more, and should be more consumed in this Island than it is, for it is a wholesome, fattening food.

Alligator Pears, or "aguacates", deserve special mention as they furnish an enormous amount of fat.

Sugar in certain sections is always at hand. It is a powerful producer of energy.

Our conclusions are that the diet of the jibaro is generally poorly balanced and that many times this results in a condition of mal-nutrition. Between an illy-balanced dietary and actual starvation, there is a great difference. One is an insufficiency of one or more of the food elements, proteids, carbohydrates, fats, or salts; the other is lack of food. Starvation came in 1899 after the hurricane and, but for the superhuman efforts of our army, would have been more terrible than it was. Starvation may come to some who are too sick to raise crops or to work, if work be found, and to some others, from one cause or another. But starvation has one general symptom, emaciation, and such sights as we see portrayed at the time of famine in India are rare here. Before death from starvation takes place, 90% of the body fat is consumed. Moreover, nearly all authors are agreed in stating, whatever be the actual condition of the blood, the red cell counts and hemoglobin percentages are above normal. This is emphatically not to be found here as a general thing. Hayem gives us two examples of blood counts in cases of genuine starvation which illustrate this point. One gave 12,000,000 red cells per cmm. and 120% hemoglobin, the other, 8,780,000 red cells.

The objections to a vegetable diet are:

1.—*Bulk.* In order to get the sufficient amount of proteid one has to consume 3,500 grams daily. This means that the stomach, which holds but 1,200 grams normally, has to be stuffed three times a day, often causing putrefaction of food and dilatation of the stomach and intestines with their well-known effects.

2.—*Insufficient assimilation.* Not only do the gastric and intestinal juices penetrate the food mass with difficulty but it is an established fact that vegetable proteids are from 20 to 40% less assimilable; in other words, that proportion is not utilized as food.

3.—*Cellulose.* This is an entirely indigestible material prominent as the exterior covering of most grains and pulses. Poorly cooked beans will pass through the intestinal canal entire on account of this jacket which, unless broken, locks up all nutritive material. In addition, by its mechanical irritation, food is hurried out of the canal before chance to absorb is given.

4.—*Vegetable diet is not as good a source of nervous energy which should be distinguished from muscular strength as evidenced by the actual force produced in a day's work.* Not only is it lacking in power to produce such energy, but it lowers the power of one to resist disease. This is apparent from the facility with which many vegetable-eating races fall an easy prey to epidemics.

All this may be modified by the fact that carbohydrates are the sources of force, and that the laborer of the tropics can generally get from his diet enough protein to build up his tissues if enough carbohydrate, or "force food," is supplied. Herein he differs vastly from the sedentary individual who fails to perspire enough to carry off the excess of water in such a diet.

In treating of this subject, we know of no saying so wise as that of Gilman Thompson; "There are many facts in nature, in addition to those already discussed, which indicate without doubt that man from his earliest prehistoric days has been omniverous, adapting himself to his surroundings and eating in his primitive condition whatever his environment afforded, with least expenditure of labour to obtain it, now vegetable, now animal food. * * * A brief glance at the dietetic habits of the more primitive tribes of mankind at present living, shows no arguments can be drawn from them as to the advantages of any particular class of food."

Taking the dietetic habits of these people into account, we may conclude that they are not materially different from what they always were. By this, it is not meant that such food is not a menace to their perfect physical well-being, nor is it intended that any one shall think that we do not share the desire of everyone to see a poorly balanced diet improved. It is also known that in certain sections great poverty has supervened from depression of certain industrial interests and that the protein element in the diet of the jibaro has suffered. We also realize that a certain degree of anemia may result from extreme poverty of protein

We therefore believe, in spite of the quotations of authorities cited (whose opinion expressed later is not different from our own on food in general), and from Thompson's remarks, that the food eaten by the jibaro in Porto Rico cannot fail to produce an effect upon the prognosis of a blood-impoverishing disease, which, above all, is seen in the lack of resisting power to a hemolytic toxin.

Lest we generalize too much, let us review some clinical observations, the results of our work.

Of 947 cases treated at Bayamon, a statement concerning the nature of the food eaten was secured from 355. Of these, 225 said that they ate the usual food of the country people; i. e., rice, beans, vegetables, and codfish (now and then) and that, such as it was, they suffered no lack in quantity. Ninety who were of the better classes or their servants, stated clearly that they had a daily mixed diet. Forty said that their food was deficient in quality and quantity. Of the 225 with the usual food of the country, 217 had their hemoglobin percentages taken with the following results.

Table 4.—

Below 20%	14	persons
Between 20 and 29%	37	“
“ 30 “ 39%	50	“
“ 40 “ 49%	47	“
“ 50 “ 59%	30	“
“ 60 “ 69%	21	“
“ 70 “ 79%	11	“
“ 80 “ 89%	5	“
“ 90 “ 100%	2	“
Total,	217	

Average hemoglobin percentage in this class, 43 + .

Of the 90 persons with a full mixed diet, 86 had hemoglobin percentages of blood taken as follows:

Table 5.—

Below 20%	2	persons
Between 20 and 29%	17	“
“ 30 “ 39%	21	“
“ 40 “ 49%	20	“
“ 50 “ 59%	11	“
“ 60 “ 69%	8	“
“ 70 “ 79%	5	“
“ 80 “ 89%	1	person
“ 90 “ 100%	1	“
	86	

Average hemoglobin percentage in this class, 43.5. The remark “best class of food” is found in two cases, one with 93% Hb and the other with 24%.

All the 40 persons on a diet, which they said was purely vegetable and restricted at that, gave hemoglobin percentages as follows:

Table 6.—

Below 20%	1	person
Between 20 and 29%	10	persons
" 30 " 39%	7	"
" 40 " 49%	8	"
" 50 " 59%	5	"
" 60 " 69%	3	"
" 70 " 79%	4	"
" 80 " 90%	2	"
	40	

Average hemoglobin percentage in this class, 44 +.

We find the following remarks in our notes on these 40 cases: "I two Toa Alta cases who ate the poorest of poor food, one had 95% Hb the other 28%". The first had extremely few ova of uncinariæ, th second many. We have repeatedly noted instances where one wit severe anemia was accompanied to clinic by markedly rosy and health individuals of the same family who ate exactly the same food. In som of these families the poorest kind of food was eaten; in others the best depending on their station in life. Generally, the healthy looking one had little or no infection; the pallid were always heavily infected.

For notable illustrations of how little food may influence th "anemia" of the Island, see Case 2 in Utuado series (Appendix) wher expulsion of uncinariæ was followed by a rise in Hb. from 38 to 100 in about six weeks, although the man never received a bite to eat at th hospital at any time, and was continually complaining of poor food a home. Case 7, same series, left the hospital after requiring six weeks t rise from 10 to 64% Hb. In two weeks more, he rose from 64 to 103 Hb., living at home and eating what his father described as the poores of food. Cases 8, 11, 15, and 47 are similar. Case 19 shows sever anemia developing, once in Ponce with good food, and once in Utuad with poor food. Cases 20 and 58 of the Utuado series and Cases 1, an especially 16, of the Bayamon series, illustrate how the best of foo does not prevent anemia of uncinariasis.

Climate. As a cause of marked anemia, per se, there is no reason able ground for fear in Porto Rico on account of climate. We will no attempt to defend what on its very face is evident: that, with a brigh sunshiny little island out in the Atlantic, fanned constantly by breezes with a mean monthly temperature of 75° in January, to 82° in August and a mean annual temperature of 72° in the mountains, excessive hea cannot be cited as a cause of anemia. If diseases run riot, the hand of man has sown them, and, until measures are taken to prevent it, he will continue to sow them and reap the fruit of his own negligence, for the climate of Porto Rico is propitious, not only for the perfect development of human kind, but for that of the manifold varieties of parasitic life. In this sense, climate is a factor in the epidemic under consideration, in that it affords to the parasite a proper temperature for its development in the open air. So does it provide a home for stegomyia fasciata, "the yellow fever mosquito," but efficient quarantine has prevented its infection.

Humidity and rainfall. The average humidity is 80% which is, of course, high. The annual rainfall varies considerably. In San Juan, it is 60 inches, but in the northeast corner of the Island it is 100 inches and over. Thus Porto Rico has an abundance of rain. It is rare, however, that the sun does not shine the major part of the day. Seasons of drought do occur, especially in certain parts of the island, but Porto Rico is noted for its heavy green mantle and rich fertile soil. There is a rather indefinite division made of a wet season and a dry season, the former corresponding to the time of harvesting the coffee crop. This is known everywhere as the sickly season, as will be noted by the inspection of annual mortality tables here.

The mud formed is slippery, grumous and prevades everything, and it is no wonder that at this time of the year the mortality rises, for here again is added another of the necessary elements in the development of the uncinaria ovum.

We realize that humidity is the general condition which aids in bringing about many diseases, but the fear of a damp locality in Porto Rico is all out of proportion to that felt in other regions. Towns are popularly divided into "damp towns" and "dry towns." Although the temperature is lower, the wet season is the deadly season, chiefly because it is the hatching time, par excellence, of uncinaria ova. We do not mean that in the dry season, often visited by rains, development does not also occur, for Porto Rico is seamed at short intervals by brooks, streams, and rivers which furnish abundant moisture. There is one more source of humidity in the island, the heavy dews, which, falling in shady spots keep them damp all day in spite of the sun.

Geographical distribution in Porto Rico. The members of the Commission have been in nearly every part of the Island, and have personally verified the presence of the disease. The few parts not visited are reported by others.

While in Bayamon the following barrios of that and other municipalities were represented at our clinic by the number of persons indicated:

Table 7.—

Bayamon, town	152
Barrio, Nuevo	137
" Juan Sanchez	15
" Hato Tejas	28
" Dajaos	38
" Cerro Gordo	41
" Minillas Abajo	26
" " Arriba	32
" Guaraguao Abajo	37
" " Arriba	34
" Camarones	3
" Santa Olalla	60
" Buena Vista	45
" Santa Rosa	19
" Pájaros	16
" Sonadora	10
" Gutiérrez	3
" Pueblo Viejo	3
" Guaynabo	7
" Palo Seco	1
" Palmas	1
Cataño, town	11
Naranjito, town	75
Barrio, Achiote	10
" Cerdo Abajo	2
" " Arriba	2
" Nuevo	5
" Anones	5
" Lomas	1
Aguas Buenas, town	1
Barrio, Juan Asencio	5
" Mulas	2
Comerio, town	2
Barrio, Rio Hondo	1
" Doña Elena	2
Corozal, town	1
Barrio, Negros	1
Rio Piedras, town	12
Caguas, "	1
Ciales "	2
Toa Baja, town	4
Barrio, Candelaria	9
Toa Alta, town	21
Barrio, Piñas	5
" Mucarabones	13
" Galateo	5
" Contorno	4
" Rio Lajas	3
" Ortiz	3
" Quebrada Arenas	5
Vega Baja, town	2
Barrio, Mavilla	1
Barros, town	1
Morovis, "	1
Manatí, "	1
Dorado, "	1
Guayama, "	1
City of San Juan	18

While in Utuado, the following barrios were represented, the list terminating with cases from other municipalities:

Barrio, Angeles * and ‡	162
" Arenas †	251
" Caguana ‡	357
" Caniaco §	184
" Caonillas †	183
" Concejo	40
" Don Alonso § and ¶	336
" Guaonico	173
" Jayuya (part †)	197
" Limon § and ¶	167
" Mameyes ‡	198
" Palmas †	11
Barrio, Paso Palma †	137
" Río Abajo ₱	345
" Rio Arriba	29
" Roncador *	171
" Sabana Grande †	280
" Salto Abajo †	161
" Salto Arriba	208
" Santa Isabel *	58
" Santa Rosa *	66
" Tetuán	99
" Viví Abajo †	128
" Viví Arriba †	98
City of Utuado	277

NOTE: We are indebted to Mr. Le Grand of Utuado for the following analyses of the soil of various barrios.

* Clay.
† Sandy clay.
‡ Clay marle.
§ Ferruginous clay.
¶ Clay and others.
₱ Very wet clay.

FIELD HOSPITAL AT BAYAMON.

CAMPAMENTO-HOSPITAL EN BAYAMÓN

FIELD HOSPITAL AT BAYAMON.

VISTA GENERAL DEL CAMPAMENTO-HOSPITAL EN BAYAMÓN.

Arecibo	62	Hatillo	2	Manatí	1
Adjuntas	85	Ciales	5	Unknown	2
Camuy	3	Lares	6		

The residence of our special cases is stated elsewhere.

Occupation and class of society affected. Eighty-five per cent, of the 953,243 inhabitants of Porto Rico, belong to the poorer classes, and 75% are agriculturists. The percentage of persons living in towns of over 8,000 inhabitants is, 8.7, and there is an average of 300 persons to the square mile in all the Island. Uncinariasis is a disease of the poor, and the poorer the man the more exposed is he to heavy infection. Here again poverty alone is considered a cause of "anemia," whereas it is really a predisposing element. It is unnecessary to mention more than a few of the occupations which bring people into conditions which favor infection.

1. *Coffee culture.* Coffee pickers and laborers on coffee estates are the most exposed of all laborers in the Island. They are doubly exposed in that the environment of their dwellings is loaded with uncinaria larvæ and that a similar condition exists at their place of work. This is, to the barefooted man, the most dangerous pursuit in Porto Rico and is enhanced by the fact that the most of their work is done at the very time when conditions are most propitious for infection. So true is this, that practically all of our Utuado cases stated that, at the time of coffee harvesting, their feet were literally "eaten up with mazamorra."

2. *Brick-making.* Here, as in Europe, the wet clay affords a rich culture medium for the larvæ.

3. *Sugar plantations.* Infection in sugar plantations is not so common at the place of work but, nevertheless, is frequent, especially in the irrigating ditches.

4. *Washing* on the edges of streams sometimes produces mazamorra. Such spots are often heavily infected.

5. *Banana groves.* A most intense infection may be acquired in such localities.

6. *Gardening.* No remarks are needed save that this is a possible means of contamination in the well-to-do who tend small flower gardens.

Habits. Uncinariasis is preeminently a filth disease. The only means of infecting the soil is by evacuation of the bowels where the ova in the feces will later develop. If latrines were generally used, uncinariasis would forever disappear. This is the key to the whole situation, as, outside the human body, the larvæ never pass beyond the encysted stage. Even the last census report gives no conception of the absolute disregard for sanitation in this respect in the country districts. Practically all of our Utuado cases stated that they deposited their feces in the open country and had no latrine nor even a hole in the ground for this purpose. Our special cases there, are fair examples of the average; of 61 persons, 55 had no latrines and 6 generally used them but only two of the latter lived in the country, the rest in the town. In Bayamon, a much larger percentage of our patients were more comfortably situated in life; 342 were questioned on this particular, and 53 stated that they used latrines; the rest, 289, never used one. Thus the average individual living in the country, barefooted and devoted to agricultural pursuits, from time to time acquires more and more uncinariæ from infections sown by himself and his neighbors. This is a constant in-flow. The time naturally comes when the parasites in his intestines die of old age or of some accident which cuts off their existence, and, as Boycott and Haldane remark, the dead larvæ are at least partially digested by the intestinal juices. Thus they are passed out of the canal with no mark by which they can be recognized.

This is one of the reasons why, when a jibaro comes to town where infection is not possible, or at least rare, he often gradually gets better of his anemia, i. e., his multiple reinfections are cut off, and the parasites he brings with him die as they reach the limit of their natural existence. Such improvement is often explained here by the statement that "the most anemic jibaro, on reaching San Juan and finding proper food and lodging, immediately begins to improve." The fact of improvement is often seen but not immediately. The reason for improvement is not correctly expounded. This is the so-called "natural cure."

A study of the following data obtained from a systematic examination of the inmates of the Girls Christian Orphanage is illustrative of this point. These girls reached the school in all grades of anemia undoubtedly due to uncinariasis. The superintendent stated that thirty-one of them were pale, some extremely so, and that after a few months, their general condition began to improve, until at the end of two or three years "all anemia" had disappeared. Four were in the institution less than two years, five between two and three years, thirty-five over three years, and one a period unknown to us. As will be seen from the table, their average hemoglobin now is 82+%, the average of those without ova in the stools being 82.8+%, and with ova 82%. A few of them are still pale. Thirty-eight of them have ova in their feces, and seven have none. There was considerable difficulty in finding ova in the majority and some had to offer a second specimen before they could be found. In general, therefore, few were encountered. They are all well shod, neat, tidy girls, and the chance of reinfection is small as good latrines are provided.

A noteworthy bit of information is obtained from the column headed "geogaphy," where sixteen are found to be "earth eaters." It would seem as though this was an almost certain mode of infection but the "earth" eaten was almost always plaster or similar incongruous material, not wet earth. Sixteen of the forty-five had this habit which throws a flood of light on the habits of the jibaro, practices which he will never acknowledge and which are only known by just such accurate data as this obtained from observing teachers.

Let us assume that practically all were infected on admission:

1. Many unicinaria gradually died off and none took their place, or, if any, very few.

2. Under good care and hygiene an individual relative immunity was established to those that remained.

Data obtained from examination of the inmates of a Girls Christian Orphanage, Bayamon.

Table 8.—

Case.	Previous Residence.	Ova of uncinariæ.	Per cent Hb.	Years in institution.	Pallor when admitted.	Geogaphy.
601	San Juan	yes	85	over 3	yes	yes
602	Bayamon	yes	50	1 year, 4 mos.	yes	yes
603	Rio Piedras	yes	62	3	yes	yes
604	Caguas	yes	70	2	yes	yes
605	Rio Piedras	yes	85	3	no	yes
606	San Juan	no	80	4	no	no
607	San Juan	no	86	4	yes, very	no
608	San Juan	no	87	3	no	no
609	Cataño	yes	110	1 year, 3 mos.	no	no
610	Bayamon	yes	76	over 3	yes, very	yes
611	Bayamon	yes	62	over 3	yes	yes
612	Rio Piedras	yes	94	2½	no	yes
613	Bayamon	yes	91	3	no	no
614	Rio Piedras	yes	64	4	yes	yes
615	Cataño	yes	101	3	yes	no
616	San Juan	yes	67	3½	yes	yes
617	San Juan	no	93	9 mos.	yes, very	no
618	San Juan	yes	83	2	yes	no
619	Bayamon	yes	82	3	no	no
621	Bayamon	yes	75	3	yes, very	no
622	Corozal	yes	110	over 3	yes, slight	no
623	Rio Piedras	yes	45	over 3	yes	yes
624	Rio Piedras	yes	60	2½	yes	no
625	Rio Piedras	no	66	3	no	no
626	Bayamon	yes	104	4	yes	no
627	San Juan	yes	94	4	yes	no

Case.	Previous Residence.	Ova of uncinariæ.	Per cent Hb.	Years in institution.	Pallor when admitted.	Geography.
628	Guayama	yes	88	3	no	no
629	Rio Piedras	yes	94	over 3	no	no
630	Cataño	no	90	over 3	no	no
631	Bayamon	yes	85	3	yes	yes
632	San Juan	yes	85	3½	no	yes
633	San Juan	yes	74	9 months	yes	no
634	Rio Piedras	yes	74	3	yes	yes
635	Bayamon	yes	87	4	yes	no
636	Bayamon	yes	75	over 3	yes	yes
637	Bayamon	yes	73	over 3	yes	no
638	Dorado	yes	78	over 3	yes	no
639	San Juan	yes	76	4	yes	no
640	Guayama	yes	76	2	no	no
641	Guayama	yes	95	—	—	—
642	Bayamon	yes	93	over 3	yes	no
643	Bayamon	yes	79	over 3	yes	yes
644	San Juan	yes	120	3½	yes	no
645	San Juan	no	78	4	yes	no
646	Cataño	yes	94	over 3	yes	no

Aside from the non-use of latrines, the various local habits, some not peculiarly affecting the disease, others offering other means of infection, need not be detailed. For example, the abuse of alcohol can hardly affect uncinariasis and its attendant anemia more than it effects other diseases; the general habit of going barefooted is a real source of danger and a means of direct infection, etc. The playing of children in muddy places should not be lost sight of.

Some curious infections occur: One prominent American, a man of most scrupulous personal habits and one in whom infection by the mouth seems impossible, contracted slight mazamorra by taking off his boots and wading in a small pool. Several months afterward ova of uncinaria were found in his stools. He informed us that another American, similarly affected, was sent home very ill with anemia, and that he is supposed to have malarial cachexia. The picture drawn of his symptoms makes it more than probable that he is at least suffering from uncinariasis, whatever else he may have.

In broad general terms, it may be stated that the conditions found in cities and large towns of the island do not conduce to so heavy an infection as in the country and that many pallid individuals seen on the streets of San Juan have been infected in the interior. The unsanitary habits of the laboring classes in some towns and hamlets render it likely that infection does take place in certain of the worst sections, given shade and moisture.

Age. The ages of all our patients, arranged in groups of five years, is as follows:

Table 9.—

Age.	Bayamon.	Utuado.	Special cases	Total.
Under 5	11	24	0	35
Between 5 and 9	99	427	5	531
" 10 and 14	122	887	18	1027
" 15 and 19	114	636	9	759
" 20 and 24	131	501	9	641
" 25 and 29	142	564	5	711
" 30 and 34	67	424	6	497
" 35 and 39	72	326	7	405
" 40 and 44	44	219	1	264
" 45 and 49	43	145	1	189
" 50 and 54	31	164	0	195
" 55 and 59	30	65	0	95
" 60 and 64	7	61	0	68
" 65 and 69	13	17	0	30
" 70 and 74	2	8	0	10
" 75 and 79	2	5	0	7
" 80 and 84	0	3	0	3
" 85 and 89	0	1	0	1
Age not given	17	5	0	22
Total..........	947	4,482	61	5,490

Thus the first decade furnished 566; the second, 1,786; the third, 1,352; the fourth, 902; the fifth, 453; the sixth, 290; the seventh, 98; the eighth, 17; the ninth, 4.

92 +% were below 50 years of age and 62 +% of these were between 10 and 30.

In interpreting these figures, we desire to call attention to a sentence in a previous report on this disease in the Island (A Study of Uncinariasis in Porto Rico, Am. Med., Vol. 6, Nos. 10 and 11): "It is a startling fact that while Porto Rico has a larger proportion of children to adults than any other state except South Carolina, yet in 1890, the percentage of persons over 60 was but 40 per 1,000, compared of 62 per 1,000 in the United States." We believe, that apart from this, the disease is most destructive in the young, not only of life, but that it is between 10 and 30 that the great amount of sickness occurs, as seen from the table. A relative immunity may, and probably does come to those who have suffered the consequences of infection and who have survived its baneful effects. Persons of all ages are liable to become infected, given exposure to the parasite.

Sex. Of 5,490 patients, 3,259 were males and 2,231 were females or 40.6+%. This is largely due to chances offered for infection, males naturally being more exposed from the nature of their occupation. Not only is this so, but the degree of anemia is less in females than in males, obeying to a certain extent, at least, the number of parasites with which each sex is infected. In Bayamon, of 577 persons in which the hemoglobin percentage was estimated, excluding the Girls Christian Orphanage cases, 165 females gave an average of 48+%Hb. and 412 males, 41+%.

Table 10.—

SEX COMPARED WITH HB.	FEMALES.	MALES.
Between 10 and 19% Hb.	7	24
" 20 " 29% "	26	86
" 30 " 39% "	30	97
" 40 " 49% "	21	97
" 50 " 59% "	29	43
" 60 " 69% "	24	34
" 70 " 79% "	20	17
" 80 " 89% "	6	9
" 90 " 99% "	1	5
Over 100% Hb.	1	0
Total	165	412

Only three of Sandwith's 400 cases were females, due, he says, to the oriental custom of immuring women.

Race and Immunity. It seems difficult to separate the two, so we have proceeded to discuss them together.

Sixty per cent of the population of the Island is said to be white. The negro race possesses a higher degree of immunity than the white but this is not absolute, in the Americas. Jacoby and Zinn state their belief in the immunity of the negro. The dangerous nature of the parasite was first practically demonstrated in Egypt and has since been fully proven there. Literature on uncinariasis is not complete without reference to the terrible ravages of this disease in that country, yet the aboriginal tribes of the Congo, and indeed, all through Africa, are infected but show no signs of disease. Here, in one continent we have a sharp contrast between the negro and the white race.

We are fortunate in having direct information of the section least explored. Mr. T. Stevenson, a missionary for some years in Central Africa, was living in Utuado during our stay there. He had had occasion to use medicine in his work in Africa, and was attracted to our camp. He told us that the food of the tribes where he served is almost exclusively vegetable; that they are men of gigantic stature and perfect physical development yet were subject to a severe dermatitis of the feet in wet weather, which they ascribed to poison laid on the ground by their enemies. He states that the resulting ulcers were very severe at times but that he had not noticed the disease in Africa, although the dermatitis was familiar to him. As to racial differences in the grade of anemia, we are able to compare 540 persons in whom race and hemoglobin were noted:

Table 11.—

RACE COMPARED WITH HB.	WHITES.	MULATTOS.	NEGROES.
Below 20% Hb.	20	8	1
Between 20 and 29% Hb.	83	23	1
" 30 " 39% "	88	31	4
" 40 " 49% "	82	26	9
" 50 " 59% "	43	26	2
" 60 " 69% "	39	16	2
" 70 " 79% "	10	11	2
" 80 " 89% "	6	5	1
" 90 " 99% "	..	..	..
" 100 " 110% "	..	..	1
Total.	371	146	23

This gives an average of 45+%Hb. for the white race, 44+% for the mulatto, and 49+% for the negro. A much more important observation was that very few negroes sought our clinic. The people who did, came not because they were pale but because they were ill, and had the negro felt ill he would have come just as readily as the mulatto. Now, Bayamon, from which came these 540 cases, is a municipality in which many negroes live. We must conclude that immunity to the toxin exists in them, at least to a certain extent. In other words, absence of several generations from its haunts reduces the immunity of the negro race.

That it is not absolute is seen by case 4,431, cited before, and we conclude that in this country, racial immunity in no longer a protection from an unusually large infection. Leichtenstern, in 1899, stated that the old races of Asia are relatively immune to the toxin but are worm carriers. Such are notably the Hindus where Dobson shows an infection of 75.58% of healthy coolies. That even there there is no absolute immunity is amply attested by the storm over this assertion, in which Thornhill and Giles proved its death-dealing qualities in that same country. But not only this, Thornhill adds that, in Ceylon, uncinariasis is more fatal than cholera, and McDonald, in that island, reports 1,760 cases treated in hospital, with 395 deaths from the disease. One of the writers had a case of a soldier with uncinariasis who was infected in the Phillipines and who said that about 20 men in the company had the same symptoms, causing them to fall out on the march. He further added that the natives are very healthy. As we know that the Filipino is infected, from various reports of our Army Medical Officers, and as their healthy condition is attested by officers who have lived there, we must suspect a racial immunity in that people also.

Thus Negroes and, possibly, Malays and Mongolians are relatively immune from the disease, while harboring the parasite, remembering that we have no knowledge of the number of worms these people usually carry, an important point. There is nothing at all strange in this, as it is well known that relative immunity exists in yellow fever, especially in negroes. No one today denies that individuals exist, in whose blood the plasmodium of malaria can be found but who show no symptoms of malaria, nor that the famous French physician, who found that 60% of the many cadavers he autopsied presented lesions caused by the tubercle bacilius, was correct in his statement that a relative immunity holds the bacillus in abeyance until a long life is run, the individual dying of other causes.

This brings us to the question of individual resistance to the toxin.

Literature and the personal experience of many here attest the frequency of infection by uncinaria without objective symptoms of disease. Many of them have no anemia, yet are clearly suffering from other manifestations of uncinariasis. Frequently our light cases in Utuado had little anemia yet were far from well, seeking our camp on that account, and, while some were lightly, others were heavily infected.

Individual resistance to the disease is natural, inherited, or acquired. In all these, one prominent factor is ever present. We refer to the conditions of life under which a person lives. As we send a case of incipient tuberculosis to parts where climatic and other influences build up the resistance; as we feed up a convalescent, with the intention of supplying to the body a force which will better enable him to cope with disease, so it is perfectly clear that good food in uncinariasis is not only an aid to recovery but an aid to the body in fighting a hemolytic poison, and to good food might be added a host of other factors. We have cited, however, an instance (Case 16, Bayamon series, Appendix). where all that care and money could bestow resulted in a complete failure until specific treatment removed the cause of his infirmity. Yet it is a valuable weapon to turn against uncinaria hominis when we are able to command a good pantry and a good bed for our sick. Thus were our desperately ill cases tided over a critical period in Bayamon and Utuado, and for this reason hospitals are needed.

Boycott and Haldane say, with regard to infection in the mines of Cornwall: "Fresh infections must, however, be occurring and the facts are most easily explained on the theory that in the majority of individuals some form of immunity is gradually established to the presence of the worms. Nearly all the men working in the mines appear to be infected. A great many of these suffered at first from anemia but gradually recovered completely without giving up their employment and without treatment. On the other hand, there are some individuals who continued to be ill for long periods even after giving up work underground and in whom therefore the immunity did not become established, though they recovered when treated with thymol." We are immediately impelled to cite the fact, that after a sharp attack of diphtheria has been overcome, the bacilli remain, propagate, and excrete their poisons in an otherwise perfectly healthy throat.

We are not, however, in accord with Boycott and Haldane that this is all a question of acquired immunity. From their descriptions we are inclined to believe that they were not dealing with such heary reinfections as we have here.

All of the data concerning predisposing causes is insignificant as compared with the following facts elicited from a study of the disease.

Of 4,482 persons treated in Utuado (excluding our special cases), not more than 300 of whom were ever rationed even for a short time by the commission, living in their homes as they had always lived, extremely poor and generally with an illy balanced, often an insufficient dietary, 2,151 were radically cured, expelling their uncinaria and leaving the clinic with normal blood, tested by instruments; 273 were practically cured, and 1,495 were improved. We may now understand why Stengel writes of secondary anemia, as follows:

"The effect of diet is difficult to determine, as the experimental evidence and some of the investigations made upon persons undergoing prolonged fasts have been quite at variance in their results. Senator and Luciani found that the blood of the Italian fasters Cetti and Lucci did not undergo the deterioration that might be expected and experiments on animals have sometimes shown considerable increase in the number of corpuscles instead of decrease. When the blood is decidedly affected this is probably due to secondary or associated conditions, such as fever, organic disturbances, etc. Continuous bad food, however, is usually associated with other debilitating influences and undoubtedly leads to anemia, as is seen by the inhabitants of besieged cities or in times of famine. * * * Residents of tropical climates frequently present a strikingly anemic appearance particularly when they have recently arrived in such climates, but to a large extent this appearance is deceptive, being probably due to vaso-motor conditions rather than to a condition of the blood itself. *The actual anæmias of the tropics are dependent upon definite and specific causes.*" (Alfred Stengel, M. D., "20th Century Practice of Medicine," v. 7. pp. 312-313, Wm. Wood & Co.). The italics are ours.

After reviewing all the evidence, we find it clear that heavy infections generally produce the disease in practically all save those who are racially immune, and often in them; that slight infections often do, and, according to the facts of immunity, may not; that moderate infections oftener do produce the disease in the people of Porto Rico than not; that every circumstance which tends to devitalize a human organism will decrease this immunity and give fuller play to a dangerous and, many times, fatal toxin.

Hence to trust alone to building up the resistance of the Porto Rican jibaro and not to treating him for his disease, would be as ridiculous and costly as to order a fire brigade to turn its entire attention to soaking with water houses a block away in the hope that this would prevent a general conflagration, leaving the fire to burn at its own sweet will. From a clear knowledge of these truths, Germany is attacking a disease for the possibilities it represents. This is all the greater tribute to their grand foresight and sane judgment, when we realize that but 6.8% of the infected workmen present signs of anemia. For the same reason, the United States and Europe are beginning to view uncinariasis with alarm and to seek to stamp it out before a general sacrifice of health, happiness, and human life is made.

Porto Rico has taken the initiative in the Tropics in inquiring into the cause of the profound anèmia of her laboring classes and in testing feasible means of treatment and prophylaxis. We have seen that the major portion of this "anemia" is uncinariasis and we earnestly recommend to our professional brethren, some of whom need no such recommendation, that no further reliance be placed on iron, quinine, and tonics in general, which after a trial of years have proved themselves utterly incapable of controlling a disease which is every day threatening more and more the existence of the unfortunate jibaro.

SYMPTOMATOLOGY.

There have been many writers who have declared the symptoms of uncinariasis those of a mere anemia. It is plain to us that this is too restricted a view of the disease. Uncinariasis is a clinical entity. Varieties of acute and chronic uncinariasis may be recognized, and to these may be added another in which an acute supervenes upon a chronic form.

For convenience, three grades of the disease are distinguished: *slight*, *moderate*, and *marked.*

The simple harboring of the worm, as we have shown, does not necessarily constitute uncinariasis. Such persons are a source of danger to the country and are liable to develop symptoms or to "break down" under some strain or condition which would not ordinarily affect the uninfected. Except the few whose relative immunity is pronounced, these individuals contain comparatively few worms. But when they become hosts of from 300 to 400, symptoms of the disease make themselves manifest unless the resistance to the toxin is still sufficient to ward them off. In general terms therefore, uncinariasis is largely a question of intensity of infection.

Slight cases. Such are those who posses little or no pallor or, at best, show but an indefinable, dirty yellow tinge of the skin in whites, a slight pastiness in mulattoes. There is a reduction in the normal amount of perspiration.

The appetite is apt to be capricious. Attacks of gastralgia are felt at odd times, or at least, a little uneasiness in the epigastrium; a tendency to meteorism; slight breathlessness on exertion; occasional palpitation of the heart; dizziness; headache; lack of attention to details and a little dulling of the mental faculties. The muscles are flabby, and weakness and indisposition to labor exist. The hemoglobin of such persons generally lies between 60% and normal, the former sometimes in spite of a good color.

Moderate cases. These form the usual type seen in Porto Rico, although, naturally, marked cases predominated among those applying for treatment. Here, all symptoms noted under slight cases are more prominent. The pallor is definite. The mucous membranes are paler than normal; the skin is quite dry, and sweating is rare. Appetite may be exaggerated to the point of bulimia or even perverted to geogaphy. Nausea is frequent; vomiting may occur at times. The tongue is coated and often flabby and enlarged. There may be some tenderness of the epigastrium and abdomen with spontaneous pain and heaviness. Breathlessness is much more easily elicited. Palpitation of the heart is frequent and severe and not always relative to exertion. The pulse is more rapid, and is liable to be weak and compressible. There is often a hemic murmur of the heart and a little hypertrophy. The pulsation of the vessels of the neck is noticeable. There is much pain in the sternum and chest with a feeling of weakness of knees and legs. The patient feels sick. There is much dizziness, especially on sudden changes of position, noise in the ears, and frequent headache. The mental condition is decidedly depressed, and the patient is quite passive to his surroundings and appears stupid. Sometimes the patellar reflex is exaggerated but more often it is diminished. There is susceptibility to cold, and tingling of the feet which frequently "go to sleep". The muscles are flabby and a little painful. Joint pains are so common that a diagnosis of rheumatism is often made. Work is undertaken with great effort.

The hemoglobin is apt to be between 30 and 60%.

Marked cases. Here the patient has arrived at that stage where a fatal termination may occur at any time. The pallor is very extreme. Edema of the feet and ankles alone, or sometimes extreme anasarca are seen. The digestive disturbances have changed in character; appetite is often nil, often enormous. Some of the worst forms of geogaphy are here seen. Nausea and vomiting are frequent. Ascites is liable to appear and become alarming. Diarrhea may alternate with constipation.

There is distressing dyspnea on the slightest movement and sometimes when the patient is perfectly quiet; severe palpitation of the heart; precordial pain; rapid, weak, compressible pulse, and often dilatation of the heart. Marked pulsation of the vessels of the neck and the base of the neck may be noticed at some distance. There is often pulsation of the great veins with bruit-de-diable of the jugulars. Dizziness and tinnitus aurium are extreme. There is much headache and insomnia. The patellar reflex is abolished. In men, impotence is an almost invariable symptom; amenorrhea in women. The intellect is much dulled; mental processes are slow and the patient seems confused and stupid. His facial expression is melancholic and anxious. Paresthesias become very marked. There is a tendency to dilatation of the pupil and blurred vision exists. The urine has a low specific gravity, is abundant in quantity and usually contains no albumen.

The muscles are flabby, sore, and painful. Extreme weakness, even to the simulation of paralysis, is observed and the patient is incapacited for labor. There may be irregular fever with intervals of subnormal temperature.

Acute uncinariasis is marked by profound digestive symptoms, rapid hemolysis, marked nervous symptoms and a tendency to edema and effusion into serous cavities.

Let us analyze the symptoms and discuss more in detail their chief characteristics.

GENERAL DEVELOPMENT.

Uncinariasis of childhood is a potent cause of retarded development and of stunted mental and physical growth thereafter. We have been often deceived in the true age of an individual, persons of 20 years seeming to be of 12 or 15. Puberty is often delayed. In males the parts are undeveloped and the hair of the body lacking. In females, menstruation, which occurs here at a much earlier age than in the more temperate climates, may not make its appearance until the age of 18 to 20. We have known cases where children have been born of mothers who have said that they had never menstruated. More than all, many children born of anemic mothers, are rachitic and are little resistant to disease and hardship.

TEMPERATURE.

Fever at the onset of the disease is probably a fairly constant symptom. Later, the temperature in chronic cases is normal, or subnormal. "Anemic fever" or evanescent rises of temperature occur during the course of the disease. One cause of fever in our cases seems to result from the bacillary invasion of the blood, with edema, as described later.

THE SKIN.

Mazamorra. The lesions have been mentioned. Ranging from a few itching papules to severe dermatitis which lays up our patient in bed, we find that usually this is the first symptom of the disease. The eruption is generally found between the toes and on the lateral and dorsal surfaces of the feet. Claude Smith's observation, that walking in the mud causes it to be squeezed in between the toes and thus offers a better chance for infection, is borne out by the facts here. Itching and tingling rapidly follow, and by the next night, are almost insupportable. When pustules form itching is little by little replaced by pain, heat, swelling, etc. It must not be supposed that the feet, the usual site of infection, is the only one. It may extend even to the buttocks and indeed, any part of the body. We have often had histories of it on the hands of washerwomen and others; in one case infection occurred through the skin of the face. "Mazamorra" is a Spanish word whose use is corrupted by the jibaro. It usually means to them a separate and distinct disease of the feet, and they limit it to the phenomena attendant on uncinarial dermatitis. They declare it to be the penetration of the skin by "culebras," or little serpents, to be found in certain pools of stagnant water, decomposing vegetable matter, and mud. The distinction made by the jibaro between mazamorra and other forms of dermatitis of the feet is not made by the better classes. Mazamorra is understood by the latter to signify any dermatitis of the feet, although other and more elegant words are used as a rule. We are unable to trace the exact application of the Spanish word to this affection, but as one of its correct meanings is "that which is left over" from a meal, the "slops" in plain English, it carries the idea of putrefaction. Mazamorra usually heals in from one to two weeks but ulcers of severe type are frequently left which lead the unfamiliar to diagnose anemic ulcer, syphilis, varicose ulcer, "tropical ulcer," etc. They are very resistant to treatment. In from eight days to two months, pain in the stomach, weakness, malaise, a little breathlessness on exertion and, perhaps a little fever are observed in susceptible individuals. We have often observed that 8 days after uncinarial dermatitis these symptoms were spontaneously complained of by the patient and have since noticed that Claude Smith reports a case of this kind.

Pallor. The pallor is not usually a mere whitening of the skin. There is almost always an icteric hue which rarely becomes true icterus. The color has been described as "lemon tinted," "waxy white to a yellow or tan," "tallowy," "yellowish green," etc. We prefer to describe it as a dirty-yellowish or muddy color. This is considerably modified by the normal complexion and, in mulattos, a greyish, pasty color is noted; in negroes a darker, ashen gray. We have seen a dead white skin in blondes. It is very rash to always judge of anemia by pallor. Aside from the remarks made under pseudo-anemia, we desire to call attention to descriptions of the pallor possessed by some of our patients, and found upon their histories, together with the actual hemoglobinometric readings taken later the same day.

Table 12.—

"Not very noticeable"............	Hb.	40%
"Little".....	"	39, 42, 50, 54%
"Pronounced"....................	"	62, 65%
"Marked".......................	"	58, 86%
"Slightly Marked"	"	24, 44, 47%
"None".........................	"	43, 57%
"Relatively severe"..............	"	58%

"Decided"	"	74%
"Very pallid"	"	70%
"Moderate"	"	22, 32, 33, 34%
"Dirty-greenish-yellow"	"	62%

In a general way, however, it is a fair superficial guide to the anemia present and is noticed by every stranger who comes to the Island. The proportion of our patients presenting this symptom with its degree is represented by the notes on 146 Bayamon cases:

Table 13.—

No pallor	4
Slight pallor	17
Moderate "	30
Marked "	48
Extreme "	47
	146

Comparing this with the clinical type of 337 cases in Bayamon, we have:

Table 14.—

Slight cases	10
Moderate "	71
Marked "	193
Extreme "	63
	337

Of these, 87 had edema, and 109 presented marked nervous symptoms.

In fact, a profound anemia is not present in many cases with severe clinical symptoms.

The actual hemoglobin of 65 such cases was as follows:

Table 15.—

Between	50	and	54%	8	persons
"	55	"	59%	10	"
"	60	"	64%	15	"
"	65	"	69%	10	"
"	70	"	74%	7	"
"	75	"	79%	6	"
"	80	"	84%	2	"
"	85	"	89%	4	"
"	90	"	95%	3	"
				65	

Inspection of the mucous membranes affords a better opportunity for making a rough estimate of the anemia present. Especially is this true of the conjunctivæ. If there is no inflammation present and care be exercised not to produce a compression of the vessels, practice will accustom one to judge within 20 of the real hemoglobin percentage. Sometimes it is difficult to tell at a glance where the mucous membrane of the lip ends and the skin begins. The pallor is progressive; first the bulbar conjunctivæ becomes pale, then, little by little, the sac becomes gray, turning milky white or yellowish. Eventually all, or almost all, color disappears from the skin. The scleræ are a brilliant white or, in brunettes, bluish white, (a point of distinction from malarial cachexia) and our patient looks more like a waxen figure than a human being. In many cases there is an increase of pigment, and ephelides and chloasma are observed, In cases where the heart is seriously complicated, cyanosis is prominent, especially in the lips.

The body is usually well nourished. The flesh is flabby but not doughy in the moderate grades of the disease, in other words, not edematous. Later in the course of the affection when anasarca ensues, no correct estimate as to amount of flesh can be made. Emaciation, however, is not a usual sympton of uncinariasis, and when it occurs, is likely to be due to intercurrent disease, starvation, or severe digestive disturbances.

Edema. To add to the weird appearance of the patient, edema of the face may supervene, distorting and blotting out facial expression. Edema, in general, is a late symptom when due to circulatory disturbances, but this condition must not be confused with the frequent edema due to bacillary invasion, mentioned under complications.

The following is a classification of our edematous patients in Bayamon whose hemoglobin was taken. The percentages are arranged in groups of 10.

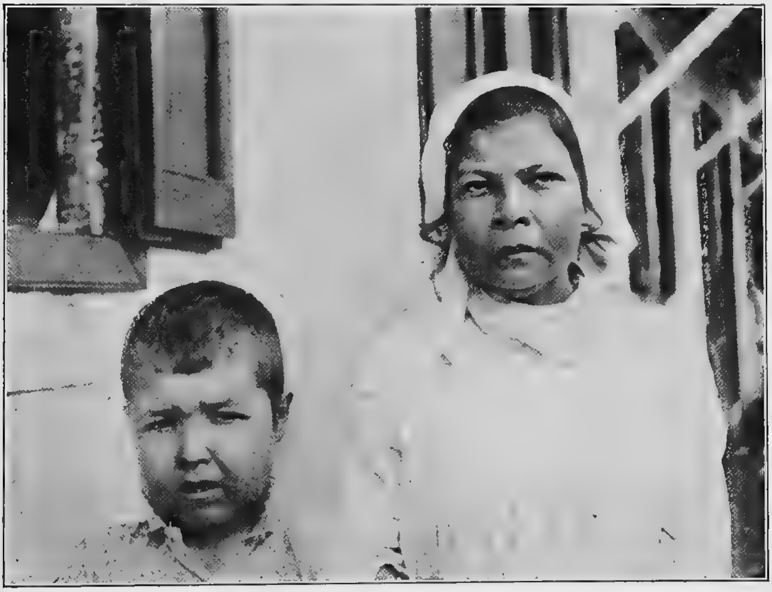
Table 16.—

Below	20%			7	persons
Between	20	and	29%	22	"
"	30	"	39%	23	"
"	40	"	49%	12	"
"	50	"	59%	4	"
"	60	"	69%	7	"
"	70	"	79%	2	"
"	80	"	89%	2	"
				79	

Edema of the lower extremities is to be found in nearly all extreme cases, first in the feet and ankles, then in the legs; it often involves the

OUTPATIENTS AWAITING THEIR TURN AT THE MORNING CLINIC AT UTUADO.

PACIENTES DEL CONSULTORIO EN UTUADO ESPERANDO SU TURNO DESDE LAS PRIMERAS HORAS DE LA MAÑANA.



TYPICAL FACIAL EXPRESSION OF THE SUFFERERS.

EXPRESIÓN DE LA FISONOMIA EN LOS AFECTADOS DE UNCINARIASIS

scrotum which may become enormously swollen, then the face, where it appears chiefly in the eyelids and cheeks, and, finally, the entire body. To illustrate to what extremes anasarca may come, we may call attention to a case whose whole body was "water-logged." She could not walk, could not see, the eyelids looking as if dry cups had been applied, and when her pulse was taken, the impression of the whole hand was left deeply sunken in the enormously swollen wrist, yet she recovered and became perfectly well, rosy, and fat, running from 20 to 98% Hb. But edema often results from a remote cardiac lesion due to fatty degeneration, or valvular sclerosis, consequent upon some previous attack of uncinariasis. We had such a case, an old man with 65% Hb, almost as edematous as the above cited. He lingered 55 days, had no uncinariæ after his second week of treatment, and died of valvular disease of the heart, a sequela of uncinariasis. The urine was examined for albumin in a number of our most edematous patients with negative result.

Petechiæ are often observed in the middle-aged and the aged.

General pruritus is a frequent symptom.

Lack of perspiration. The skin is generally harsh and dry in moderate and marked cases but this is not nearly so pronounced as lack of sweating. Many hail the return of perspiration after anthelmintic treatment, as the signal of improvement, inasmuch as this function had been suppressed even during hard work in the hot sun.

Atrophy of the skin is a marked symptom in chronic cases. The skin, especially of the face, is wrinkled, often deeply furrowed, harsh and parchment-like. Many a young person thus appears old and worn who, in a few months after expulsion of all parasites, regains a smooth and fresh looking face, compatible with the actual age.

MUSCLES.

There is a tendency to ready fatigue of muscles, and patients tire easily. The muscles are flabby and the seat of a dull ache. This weakness may reach an extreme grade with soreness and, indeed, may roughly simulate paralysis, a condition excluded by careful examination. Such cases with the heart signs and edema, may be taken for beri-beri by those who have never seen it, a disease which should never be confounded with uncinariasis. One of the writers saw several cases of true beri-beri in Cadiz and the clinical picture was totally distinct from uncinariasis. We also wish to call attention to the fact, that in spite of all that has been said of "laziness" in connection with this disease, in the press of the United States, we have seen unfortunate creatures in Porto Rico, working with only 30%, or even 20%, hemoglobin, who would be in their beds in many other countries. It goes without saying that laziness is a moral defect, where it occurs, and has no place in any scientific medical treatise. If laziness exists it is a thing apart, and it is only desired to warn the laity not to pas judgment upon a sick man too weak to work.

Leichtenstern states that he has found joint pains common and w can certainly corroborate his observations in this regard and in respect t the great prevalence of pains in the bones, especially the sternum, a almost universal symptom in our patients.

THE EYE.

Major W. F. Lippitt, U. S. Army, examined the eye grounds o ten of our cases and found evidences of old retinal hemorrhages in tw which he kindly demonstrated to us. The fundus is generally ver pale and the retinal arteries small. Many authors report neuro-retinitis Moulli reports edema of the papilla. Lutz states that from 7 to 8 show changes in the eye grounds. Mensche found that the tempora half of the visual field shows obscurity.

Night-blindness is not a symptom to be ignored. Thornhill report 9.5% of his cases thus afflicted and Swan and Nell 24% (!). Cases 6 an 8 of the special cases at Utuado, and case 1 of the Bayamon serie presented this condition. Only our special cases were questioned o this point but two of our general series volunteered the information tha they suffered from it.

Cataract. A most interesting observation is its great prevalenc in Porto Rico, not only in the old but sometimes in the young Major Lippitt, whose experience is large, states that fully three-fourth of his cases in Porto Rico were anemic. A. W. Calhoun (Ophthalmic Record, new series, Vol. XII, No. 7, April, 1904), calls attention t the occurrence in several of his cases, of a double, chalky-white cataract beginning a short while (one year) after the establishment of uncinariasis. One was a boy, 14 years of age, where the condition began months after the disease, and another a boy 16 years old.

Corneal ulcers are also reported.

We made a special effort to corroborate Stiles' observations o the pupil and found, indeed, a decided tendency to its dilatation But the patient is weak, dizzy, and sick, and although we have no seen that writer demonstrate how he obtains the phenomenon described we cannot believe it to be diagnostic. The fact is, in trying to demonstrate this symptom, we nearly hypnotized some of our patients. Stile says, "If the patient is directed to stare intently into the observer eyes, there will be noticed a symptom which it is difficult to describe but which I have found more constant than almost any other noticed namely: After a moment, the length of time *apparently* varying slightl according to the degree of the disease, the pupils dilate and the patient eyes assume a dull, blank, almost fish-like or cadaveric stare, very similar to that noticed in cases of extreme alcoholic intoxication." He states that he does not go to the extent of considering the stare diagnostic of uncinariasis. We certainly do not consider this a prominent symptom per se, but the dilatability of the pupil is noticeable and goes to make up the *tout ensemble* of a facies which is very suggestive of uncinariasis. The expression in moderate and marked cases, as will be noticed by the cuts in this report, is habitual and need not be elicited in this manner. Not only this, but we may consider ready dilatability of the pupil a symptom of many intestinal parasitic diseases. Blurring of vision, flashes of light and muscæ volitantes are very common.

DIGESTIVE SYSTEM.

The series of symptoms pertaining to the digestive tract are not nearly so prominent in a well marked case of uncinariasis as are those of the circulatory and nervous system. For this reason they are apt to be too hastily passed over by patient and physician, but, although at times indefinite, a fairly clear history may be elicited of the symptoms we are about to recount. The period of marked digestive symptoms is found at the inception of the disease. The patient may forget to mention them and the physician to ask about them.

The appetite. This is variable. Generally there is increased appetite, often reaching bulimia in the moderate and marked cases but in the last stages, there is frequently complete anorexia. Apart from the nature of the food, the jibaro desires bulk. He wants to fill up. From this is but a step to geogaphy, at times a source of infection, but more properly considered a symptom. "Geophagia" or "allotriophagia," as the disease has been called, is not a symptom of uncinariasis alone, but occurs in chlorosis, in pregnancy, and in the presence of other intestinal worms. We formerly believed this to be a symptom mainly confined, in Porto Rico, to children, but in one form or another it is found in many adults. Save in children, the eating of mud is not nearly as common as the eating of raw rice, coffee, corn, and vegetables. We know of one case where cigar ashes were eaten. It is known as "el vicio," "*the* vice," among the country people. We had one case in hospital, an old negro, who reached camp in a pitiable condition from uncinariasis. He was all doubled up and very weak, crawling from place to place on hands and knees. This man, to gratify his inordinate appetite for earth, used to elude all vigilance and painfully crawl away to some distance in a neighboring field where he would satisfy his craving and howl for the nurse to carry him back to his bed. We expelled most of his uncinariæ and were obliged to send him home on account of this and other filthy habits. To our surprise, we later met him in the streets of Utuado, walking upright and wonderfully improved. Besides earth, plaster, feathers, paper, unripe fruit, charcoal, etc., are consumed.

Tongue. The tongue is pale, often has a whitish coat, is enlarged and tooth-indented. At times it is partially denuded of epithelium, raw and red. A peculiar and often mentioned symptom is the presence of two purplish smears, one on each side of the central line, making it appear as if a pencil had been sucked. These are engorged veins and when seen, which is not very common, are circulatory phenomena. This sign should be distinguished from the pigmented spots on tongue and buccal mucous membrane, seen rather more frequently. They are from two mm. to four cm. in diameter and are apt to be found in patients of mixed race. We could not establish any clear connection between these spots and the disease.

Catarrhal stomatitis is sometimes present. It may be very severe as in one case at Utuado, an old negro woman, where it had denuded tongue, gums, and buccal mucous membrane, extending over the lips to the skin line. It is a very inconstant phenomenon and seems to depend on severe gastritis if not on some local condition.

Salivation. This is a frequent phenomenon reaching at times a marked grade.

Flatulence and heartburn are common symptoms and are referable to the dyspepsia present.

Nausea. This is rather a frequent symptom and, apart from the condition of the stomach, is, with vomiting, an accompaniment to the dizziness, weakness, and tendency to syncope.

Vomiting is rarer but has been present in several cases of marked dilation of the stomach observed. It may occur independently of gastritis, as does nausea, from a tendency to faint. Vomiting of blood should raise a suspicion of gastric ulcer. We have had one such case.

Pain and tenderness in the epigastrium. This is the most constant, most suggestive and most clearly marked of all the symptoms of the digestive tract. It is often the only one mentioned. In a large percentage of our cases, pain in the epigastrium is complained of at the onset of the disease, and at odd times throughout its course. There may be only a weight and fullness, or a throbbing, or burning, but generally the patient describes a lancinating sharp pain, at times relieved by taking food. If tenderness is not elicited in the epigastrium, it may be by pressing upon the right hypochondrium. Lutz connects this clearly with the injury done the small intestine, and authors state that at the time of coitus of the worms, the frequent change of feeding ground induces the epigastric distress.

Dilatation of the stomach is fairly common. A marked case is No. 3 of the Utuado special series.

Enteralgia. This is rarely prominent, strange to say. There may be general abdominal tenderness.

Meteorism. A greater or less degree of tympanites may be generally observed and is the next most prominent symptom in the digestive system. It is the result of illy-digested starches as a rule, and may reach a very severe grade, interfering with breathing, or produce a chronic "pot-belly," a not infrequent sign in children.

Ascites. The previous condition may be heightened by ascites. In four of our cases the dyspnea caused in this way brought the patients to such agony in their efforts to breathe, that paracentesis was absolutely needful. Large quantities of a pale straw-colored serum were brought away giving much relief. This symptom is very common in the latter stages of the disease.

Bowels. Constipation is the rule but as the worst stage approaches, this alternates with diarrhea. This is a general statement but often there is no deviation from the normal.

Feces. Little may be learned from a macroscopic examination of the feces. Blood, macroscopically, is rarely seen. Of over 22,000 specimens of feces brought us for examination, only six contained blood, and five blood and mucus, from a naked eye inspection. Neither is it a prominent feature microscopically, although more frequently seen. It should be remembered that bilharziosis of the rectum was of much more frequent occurrence than appears from this report. Mucus in the stool was not common, but undigested food was frequently observed. Blood in the feces is said to be a common condition when the worms are young and are changing position in the intestine. Stiles recommends, to those who do not possess a microscope, as a rough test for uncinariasis, that feces be placed on a piece of white blotting paper. He says, "It leaves upon the paper a reddish-brown stain, similar to a blood stain." We agree with Craig who considers it of limited application and exposed to the danger of confusion with other diseases such as, chronic diarrhea, chronic dysentery, and chronic colitis. Charcot-Leyden crystals are very common and are often found in enormous numbers. They are a valuable guide-post when ova of uncinaria are not readily found, although they are observed in the presence of other intestinal parasites. We have not been able to establish any clear relation between their abundance and eosinophilia. An inspection of our Utuado special cases will demonstrate this fact.

Ova of uncinariæ. We are evidently dealing with very heavy infections here. One reading the reports of the disease in England, France, Belgium, and Germany, is struck with this fact. Twenty ova to a field ($\frac{1}{3}$ objective, 4 ocular) is common and we have often seen more than this, even to a hundred. Rare is it that the first field does not disclose one. Other parasites will be discussed under complications.

CIRCULATORY SYSTEM.

The disturbances caused in the circulatory system are among the the chief sources of suffering and invaliding of the patient.

Heart. The protean nature of the symptoms and physical signs in this organ impresses itself upon every one who has an opportunity to investigate the disease here. "Mal-de-cœur", as a popular name for uncinariasis is not inappropriate.

Physical diagnosis. Inspection: The apex beat is pronounced in the slight grades of the disease, due to overaction of the heart muscle. In the moderate grades it is often found to be displaced downward and to the left. In the marked grades, a notable phenomenon is the great reduction of the force of the apex beat which is replaced by a wavy, indefinite pulsation in the epigastrium, or a tumultuous heaving of the whole precordium. Cyanosis is liable to be noticed in such cases, chiefly in the lips, and contributes to the muddy-gray element in forming the color of so many anemics here.

Palpation: This corroborates the signs described above. A presystolic thrill is not infrequently noted in moderate, and especially in severe cases.

Percussion: In the slight grades hypertrophy is generally not made out. In the moderate grades, hypertrophy, especially of the left ventricle, is the cause of enlargement of the heart area which may reach the nipple line. In the severe grades a general increase is noted, often due to dilatation or pericardial effusion.

Auscultation: The point at which murmurs are best heard in this disease is the third left intercostal space. In light cases an impure first sound and snappy aortic valves may be the only sign present. In moderate cases hemic murmurs are almost always present and may take on a seemingly organic character. Indeed, they may become organic. In dilatation the usual confusion of murmurs may be found.

Vessels. At first the heart's overaction is but slightly noted, chiefly in the vessels of the neck. As the disease becomes more severe the tremendous pulsation in the supraclavicular spaces may be seen at some distance. Pulsation and bruit-de-diable in the jugulars are not infrequent. We have seen pulsation of the brachial vein and its ramifications with every one marked by little knots, corresponding to the sites of valves.

One of the most common errors in diagnosis is aneurism of the vessels at the base of the neck and the aorta. Where harsh murmurs are transmitted to the arteries, the pulsation and pain in the sternum are excessive and, where a thrill is perceptible, it is really difficult to exclude on a simple examination of the circulatory system, and aneurism may indeed become a complication.

Distension of superficial abdominal veins has not been infrequently seen.

Precordial pain. Excluding sternal pain, there is a cardiac pain, prolonged and diffuse. Some describe it as dull, others as sharp and burning. There is no irradiation, wherein it differs from angina pectoris and aneurism, Lutz concludes that the heart is stimulated reflexly, fatigue of the organ and pain results.

Pulpitation. This is one of the very first symptoms of the disease, and one of the most prominent and constant. Light work may induce it but later it develops in repose. It may become a very distressing symptom.

Dyspnea. This is not so common as palpitation in the light cases but it is certainly frequent and becomes universal in the latter stages where it may occasion great suffering. Boycott and Haldane state that both dyspnea and palpitation may be due to increased carbonic acid tension in the blood.

Pericardial effusion is common in the latter stages with edema, and constitutes a further obstacle to heart action.

Pulse. In the first stages the pulse is strong and full, later becoming dicrotic, then weak and compressible, until in the last stages it is rapid, thready, irregular, and intermittent. Increased frequency is a very common condition and is noted at the very inception of the disease without necessary relation to fever.

Dizziness is very common and annoying, and is to be found in all grades of the disease, reaching its greatest intensity in the latter stages. Its severity is often all out of proportion to the anemia present.

Tinnitus aurium is almost as frequent. It is often described as "poo-poo" in the head and seems closely related to heart and vascular murmurs, frequently preventing sleep by night, and stupefying the patient by day.

Syncope. Many who state that they swoon, really mean that the weakness becomes so extreme, with nausea, dizziness, and roaring in the ears, that they are obliged to sit down wherever they may happen to be. Real fainting does however, occur.

RESPIRATORY SYSTEM.

There are no characteristic signs nor symptoms. Pain in the chest is due to other causes. Edema of the lungs may occur in severe cases.

Hydrothorax is common in the last stages. A short, dry, "heart" cough is common.

NERVOUS SYSTEM.

Mental condition. A benumbing influence seems to be exerted on the mental faculties even before anemia and heart changes are noted. There is a hypochondriacal, melancholy, hopeless expression which in severe cases deepens to apparent dense stupidity, with indifference to surroundings and lack of all ambition. We believe the expression of countenance in a well-marked case, together with puffiness of the face and the peculiar color, to be very suggestive. Many of our patients stated that they came to our hospital expecting to die. Hysteria major is quite frequent. An epidemic of this nature threatened the camp once or twice but was suppressed in time by a judicious application of cold water.

Somnolence is at times marked. In one instance, two children; brother and sister, patients in the hospital, passed their entire time sleeping. Their blood was examined for trypanosoma but the result was negative. Although we had several other cases of somnolence, in general, insomnia was the usual complaint.

Headache is very frequent. It is generally temporal and frontal but pain in the vertex and cerebellar region is not rare. The prevalence of this symptom is seen in the tightly wound cloth about the forehead, so often encountered in the country.

Neuralgia occurs but is not common. It is usually confused with headache, muscle pains, joint pains, etc.

The patellar reflex is very often diminished or entirely abolished, a notably frequent condition.

Tactile sensibility is often impaired but was not carefully investigated in most of our cases.

Impotence is exceedingly frequent and in bad cases is almost always complete.

Amenorrhea is fully as frequent.

Susceptibility to cold is a common symptom. The nights in the mountains are often quite cool (even as low as 53 °F has been registered in the last year) and the complaint of being "frozen" is very common. Susceptibility to heat is less frequently noted,

Paresthesias are almost general. Tingling and formication are the most notable. Such expressions as "se me mueren las piernas," ("my legs feel dead"), and, "tengo un hormigueo en los pies", ("I feel as though ants were crawling on my feet"), are often heard. These sensations may extend to the arms or even become general. Burning of the soles of the feet and palms of the hands are frequently mentioned.

ABORTIONS AND MISCARRIAGES.

The number is very large in Porto Rico and still births often cause severe endometritis.

THE URINE.

About the only decided departure from the normal is found in the low specific gravity, pale color, and excessive amount. Rarely is albumin found. Scheube states that DeRenzi finds peptonuria and urobilinuria as a consequence of the hemolytic effect of the toxins of uncinaria.

THE SPLEEN AND LIVER.

If enlargement is present it is generally in the liver, but usually neither are enlarged, nor are symptoms referable to these organs generally elicited.

PATHOLOGY.

THE LIFE HISTORY OF UNCINARIA IN THE HUMAN HOST.

Upon numerous occasions we have observed mazamorra in our patients but the number thus affected, compared with the total of our cases of uncinariasis, was relatively small, because we were working during the dry season. The lesions were the same as those described by Smith and others. Shortly after infection, a papule forms which often becomes a red line, 1 to 4 or even 6 by .25 centimeters broad and well raised above the surface. This line may be slit up, upon which serum exudes, and a minute canal is laid patent. We have not succeeded in finding the larvæ in these lesions, first, because time did not permit of a thorough search, and second, because the dermatitis was well advanced when it first came under our observation and probably the parasite was beyond our reach. These papules become vesicles in a day or two, and from this it is only a step to pustulation, although this is not a sequence unless infection by pus organisms occurs. The phenomena here detailed are accompanied by severe pain, itching, and swelling in the part, so that the patient for a week is tormented night and day. There is undoubtedly a coincident bacillary infection. The route taken from the skin to the small intestine is still problematical. Looss found larvæ in the tissues of a leg amputated shortly after infection. On the other hand, the remarkable studies of M. F. Schaudinn (Deutsche Med. Woch., Sept. 8, 1904) on monkeys, lead him to conclude a vascular route. He killed the animals after skin infection, and found larvæ, in the mesenteric glands, intestines, pulmonary parenchyma, and blood of the heart cavities, and suggests that they may enter the subcutaneous veins and travel to the right heart, thence by the lung, bronchial tubes, trachea, larynx esophagus, and stomach to their final destination, the small intestine. As their progress through the tissues must be very slow and we have repeatedly observed patients whose digestive symptoms were marked in eight days to two weeks after infection, the circulatory route must be considered. Further investigation is needed before positive conclusions can be drawn. We are inclined to regard Grassi, Leuckart, and others as correct in their hypothesis of a stage of encystation in the submucosa of the intestine. A typical cyst may not form, but it seems probable that it is in the submucosa that the larva develops. While realizing that small worms, deeply covered by mucus and folds of mucous membrane are, to an extent, protected from the action of anthelmintics, an inspection of special case 58, Utuado series (Appendix) adds force to Grassi's theory. This is only one of many which illustrate the point in question, for we have often seen an apparently effective expulsion of uncinaria followed by the reappearance of large numbers of ova after a period ranging from two weeks to two months, although thymol was several times given in the interval. Some of these instances might have been due to suspended ovulation of the worms but some had histories of comparatively recent attacks of mazamorra. Still more suspicious is Looss' autopsy on his puppies (page 35).

However the uncinaria lives and develops, prior to its sexual maturity, the fact remains that from five to six weeks elapse after mouth infection before the ova appear in the stools, and possibly a longer period after skin infection. The usual habitat of the nematode is the jejunum, although we have found it in the stomach, duodenum, and ileum. The worm has always been considered a blood-sucker, sustaining itself by assimilation of the plasma, not the corpuscles. It is found with its head buried in the mucous membrane and the buccal capsule so well fastened to the intestinal wall as to require much force to dislodge it. Many writers have declared the amount of blood thus lost to be utterly insufficient to produce anemia of such grade, a belief with which we have been in accord. Loeb and Smith (Proceed. Path. Soc. Phila. June, 1904) state that the worm excretes a substance at the point of its attachment to the intestine, which prevents coagulation of the blood, as do leeches, and that on changing their feeding ground, they leave a wound which bleeds for some time. Calculating the loss of blood occasioned by each worm to be one drop daily, 500 would cause a loss of 20 grams. There are, however, some facts which throw doubt on hemorrhage as a cause of the anemia: 1. Blood in the stools is not a common symptom in our experience. 2. The worms are rarely seen to contain blood, in many examinations we have made. 3. In some individuals, a few worms, too few to cause an appreciable loss of blood, will keep up a severe anemia which is cured by their expulsion.

Leichtenstern believes that the male is not a blood-sucker and also states that a general change of feeding ground is apt to occur every three to six months. During pairing time, colicky pain and all digestive symptoms are prominent and blood sometimes appears in the stools, but in the intervals, neither one nor the other are marked. Upon one occasion he found, of 14,000 worms, one pair in copulation, and, in another instance, he found 36 in coition, of 780. By comparing the number of bites with the number of worms, it is seen that the former exceed the latter.

Our own observations lead us to consider the latter discussions of little moment here. The worm undoubtedly changes feeding ground but as the infected in Porto Rico are constantly receiving fresh infections, they cannot well be free from pairing of their uncinariæ at any stated time. Pains in the epigastrium are common in all stages of the disease here, perhaps due to frequent reinfections. Mosler and Peiper state that a change of locality may be effected by the worm burrowing under the mucosa. The late observations of Looss are of the greatest interest. He states that all authors until now, save Sangalli, have agreed that the nematode is a blood-sucker. The latter believed that the uncinaria feeds on the intestinal mucosa, a view which Looss declares is correct, and adds that if blood is found in the intestinal canal of the worm, it means that by accident it has opened up some vessel which, if small, causes slight and imperceptible bleeding, if large, hemorrhage which will be perceptible in the stools. He promises to demonstrate in a forthcoming work, a piece of submucous tissue in the esophagus of a worm, just reaching its intestinal canal.

Considering loss of blood by hemorrhage a partial source of anemia, let us turn to what is undoubtedly the chief cause of this and, perhaps, many other pathologic conditions found during life and at autopsy —the toxin. The reasons for our belief in a specific toxin are:

1. There is a remarkable eosinophilia in this disease, to be discussed later.

2. There are nervous symptoms, out of all proportion to the anemia actually present.

3. There is a rapid improvement in the mental condition of the patient while yet the treatment has failed to affect the other symptoms, especially the anemia.

4. There is a relative immunity to the disease, enjoyed by some who harbor the parasites. All equally infected should lose a like amount of blood and, if hemorrhage alone were the cause of anemia, we would not see such disparity in the reaction to the infection as daily experience demonstrates.

5. The experiments of Lussana, Bohland, Arslan, and others suggest the toxin.

6. Schaumann's proof of the tremendous anemia caused by Bothriocephalus latus which is not a blood-sucker.

7. Looss' recent experiment on puppies in which larvæ not yet emerged from their capsules, induced a fatal anemia.

8. By some cases of anemia in human beings supervening on infection when time was not given for the ultimate ecdysis and formation of a suctorial apparatus (special case 19 and others.)

9. The repeated observation that red cells may be normal, or nearly so, with a very low hemoglobin, and this at the onset of the disease.

10. Daniels' investigations and those of others on the liver and kidneys of persons dead of uncinariasis, in which yellow pigment indicating hemolysis was found.

11. Retinal hemorrhages and other suggestive conditions frequently found in the eye in uncinariasis.

It should be added that Felice Lussana was the first to doubt that the amount of blood lost by hemorrhage was sufficient to cause such anemia. He extracted from the urine of persons ill of uncinariasis, before treatment, a substance which, injected into hares, produced profound anemia. When the injections were stopped, the blood of these animals rapidly recuperated. He cured his patients of their disease, and a similar procedure failed to produce anemia in the laboratory animals. This work was confirmed by Arslan, Crisafulli, de Renzi, and others, and Bohland, Battistini, and Micheli found that a decomposition of albumen resulted in adding the toxic substance from such patients.

The third great cause of anemia is the mechanical wounding of the intestine, setting up chronic inflammation and perhaps affording entrance to micro-organisms. As the disease progresses, over-stuffing of the stomach, chronic disease of vital organs like the liver and heart, and a host of concomitant causes aid in protracting and aggravating the deterioration of the blood.

MORBID ANATOMY.

Our information is taken from various autopsies made by ourselves and from records furnished by the literature.

The *skin* is pale lemon in color and waxy.

The *body* usually shows no emaciation. Subcutaneous fat is abundant and of a light yellow color. Muscles are very pale and friable. All organs are extremely pale and show their bloodlessness on section. Edema is often extensive and apt to be severe in the abdomen and lower extremities. An enormous quantity of serous fluid of a straw color is frequently found in the peritoneal cavity, and hydrothorax, pericardial effusion, and effusion into the ventricles of the brain are common. The marrow of the bones is grayish-red in color and shows great lack of fat.

Heart. We have been several times surprised to find the heart of normal size, but generally enlargement is seen, especially with secondary valvular lesions and subsequent dilatation. Sometimes there is hypertrophy of the left ventricle. Soft dark clots are usually found in the chambers. A common phenomenon is an abnormal amount of extracardial fat.

The organ is friable and the seat of fatty degeneration with a pale, decided brownish-yellow color. Occasionally there is a marked fatty degeneration of the base of the papillary muscles, so much so as to show a yellow spot on transverse section. In a certain proportion of cases, endarteritis of the aorta is found with valvular changes. Sandwith reports three such cases out of ten with mitral changes. These secondary changes are by no means rare, and caused the death of at least one of our patients whose anemia was very slight at the time.

Lungs. Edema is a frequent, almost constant, feature. Here the anemia is seen to be very intense.

Spleen. This organ is not usually enlarged and is apt to be shrunken and friable. One-third of Sandwith's cases, however, revealed an enlarged spleen.

Liver. Very pale, not enlarged, and of a decided, light brownish-yellow color, with a bright greenish-yellow cut section. Extreme friability may be noted. According to our experience, this appearance of the liver is marked and constant. Scheube says that amyloid degeneration is rarely found.

Pancreas. No constant changes save extreme anemia. Some Brazilian authors state that this organ is enlarged but we have not been able to confirm it.

Kidneys. Very pale and slightly fatty. Sometimes they are the seat of parenchymatous or interstitial inflammation; sometimes of amyloid degeneration but, generally speaking, the kidneys are not markedly involved. Sandwith and Capps report small cysts in the kidney.

Stomach and Intestines. The stomach is generally dilated, in Porto Rico, sometimes enormously, and is the seat of a chronic catarrh. We have found uncinariæ in this organ but lying free and unattached in the cavity.

The greatest number of uncinariæ are to be found in the upper and middle third, of the jejunum. We have found them also in the duodenum and jejunum. Sandwith states that as a rule the worms lie within two meters of the pylorus and, that in one of his cases, 217 of 863 were attached to the mucous membrane from which they had to be dislodged with considerable force. We have not observed many worms to be attached at the time of autopsy. At our autopsy cited in American Medicine, Sept. 12th, 1,487 uncinariæ were found, 83 in the stomach (possibly dislodged in the manipulation), 169 in the duodenum, and the rest in the jejunum. Perhaps this discrepancy may be explained by the fact that the hooks of the Old World species are the cause of their adherence to the intestinal wall. Sandwith reports that, of 18 cases who had not had thymol, six had less than ten worms, and Oswald Baker explains the matter by stating that, for the same reason that rats leave an empty house, so the uncinariæ deprived of their food in a dying man, let go their hold and pass out of the intestines. Certainly we have not seen fatal cases with few parasites unless death was due to complications. We have not observed that the lesions described by Roth and others are so prominent in infection by uncinaria americana. They are small ecchymotic spots from a millimeter to a centimeter in size, some dark red, some gray.

Roth describes them as ashen-gray nodules, .8 mm in diameter with a red center .3 mm in diameter, and surrounded by an indurated area. In our autopsies, the feeding ground of uncinaria americana can easily be passed over without being noted. Sandwith has found uncinariæ with half the body buried in the intestinal mucous membrane, and the blood cysts in the submucosa containing uncinariæ, described by Bilharz and Grassi, have already been spoken of. It is interesting to note that Grassi's blood cysts contained undeveloped larvæ. As before stated, there are usually many more lesions than worms. Sandwith found 250 uncinariæ and 575 bites in one case. As to blood in the intestines, we have never found it. Not even have we found blood-stained mucus. That it occurs is seen from the numerous reports of others. Mosler and Peiper state that where agglomerations of uncinariæ are found, there is a dark spot, seen through the intestine, from two to four centimeters in diameter.

This appears to be a hemorrhagic infiltration. Blood-stained mucus is often reported, and extensive hemorrhage into the lumen of the small intestine has been noted. Sandwith notes hemorrhage in two of his twenty-six cases. Williams reports a fatal perforating ulcer in the jejunum due to uncinariæ, and Wucherer, adhesive peritonitis. So ulceration is a possible contingency with which we must count, although a very remote danger. One change, very certain to greatly add to the discomfort of the patient, is the usual chronic interstitial inflammation of the mucous membranes due to the lesions produced by the worm. It is found to be covered with a thick tenacious mucus. We have found the wall of the small intestine very much thinned, and Wucherer noted a circumscribed narrowing of its lumen.

Other changes seen are infiltration of the solitary follicles and Peyer's patches. Baumler notes amyloid degeneration of the intestinal villi, and Craig almost complete obliteration of the valvulæ conniventes, due to atrophy.

The mesenteric glands are often the seat of hyperplasia.

Cerebral effusion. Orsi reports a case of death from meningeal and cerebral edema. The brain is exceedingly anemic and we have had cases of death from effusion of serum into the ventricles.

The following case may serve to illustrate the usual pathologic changes found.

S. J. C. admitted to hospital, Aug. 30, aged 9; male; white. Has been sick two or three years; is like a wax figure, so intense is the pallor; great edema of face and extremities. Says he never perspires; no gastralgia. Tongue has two lines, one on either side of the center of the dorsum which looks as if a lead pencil has been drawn over it. Feces normal save for enormous number of ova of uncinaria and ascaris, and some ova of tricocephalus. Suffers from dyspnea and palpitation of heart. Pulse, 120, weak and compressible. Heart dilated and marked cardiac murmurs. Marked pulsation of jugulars. Dizziness; tinnitus aurium; headache; is very despondent. Patellar reflex abolished and tactile sense dulled. Muscles flabby and painful.

This child was brought into the Municipal Hospital of Bayamon almost moribund. He had laid down in the streets completely prostrated.

Blood: Very fluid and slow to coagulate. Hb. 8%; red cells, 720,000 per cmm; leucocytes, 9,000. Differential, E., 1.2; P., 74.4; S. L., 21.6; L. L., 2; B., .8. Usual changes in reds characteristic of this profound anemia.

Treatment: Stimulative. Sept. 1st, 1904, received 1 gram thymol, sod. sulphat 10. He brightened up considerably next day. On the evening of the 3rd, while laughing, was taken with all the usual signs of sudden effusion into the ventricles of the brain. His death rapidly supervened. Urine tested for thymol but not a trace found, and it was in all respects normal.

Autopsy: Sept. 4, 9.30 A. M.

Body well nourished. Abundance of subcutaneous fat, edema of face and extremities. No rigor mortis. Muscles, flabby, friable, and pale. Marrow of sternum grayish-red. Lungs very anemic with marked edema of their posterior aspects. Each pleural cavity contains about 100 c.c. of a reddish—yellow fluid.

Heart: Normal in size with small white clots in left side. Its muscle is very anemic, with mottled brownish-yellow spots of degeneration. Subperitoneal and omental fat very abundant. Peritoneal fluid not measured but is about 500 c. c. Spleen shrunken and friable. Stomach greatly dilated. Intestines, large numbers of uncin. am. free in lumen. Kidneys very anemic and capsules strip easily. Appendix normal. Liver very pale brownish-yellow. Greenish-yellow on section, very friable.

BLOOD.

The blood gradually loses color and consistency until, in severe cases, it is pale, thin, and watery, resembling "beef washings." Instead of exuding in a globular drop, it spreads out and runs down the lobe of the ear so that it is often difficult to secure one of sufficient size for examination.

Coagulation was observed to take place slowly but it was not timed exactly, neither did we attempt to study reaction, specific gravity, volume of corpuscles, and volume of blood, owing to lack of time and instruments.

Hemoglobin. We used the hemoglobinometers of von Fleischl, Gower, and Dare, and noted some variation in the results when the same drop of blood was examined by the different instruments. As we had begun to work with the first-named, we continued to use it as our standard, even though the others generally registered slightly higher. For those who cannot afford the costlier instruments, many authors recommend the Tallqvist apparatus as sufficiently accurate for clinical work.

Regarding the hemoglobin as the best index to the grade of anemia, it was estimated on entrance in 579 Bayamon cases, in which it ranged from 9 to 101%, averaging 43.09%. In one instance in Utuado, we found 8%, and the patient was improving when transferred to the city hospital, on our departure from that place. In all very low cases, the amount of blood taken was doubled or trebled and the result divided. The special cases in Utuado varied from 9 to 65%, with an average of 24.38%, but this should not be taken as the representative average of all Utuado cases, for they include too great a proportion of severe cases selected for the purpose of study. In the above series of 579 cases, the operation was repeated on 423 at subsequent visits, with the following results; 371 gained from 1 to 71%, average gain 21.34+; 45 lost from 1 to 16%, average loss 5.04+; 7 neither gained nor lost. It must be understood that they were under treatment varying lengths of time and few over six weeks.

The pallor does not bear a constant relation to the percentage of hemoglobin, and is a very deceptive guide. We much prefer the conjunctivæ, though often made deceptive here by trachoma.

The rise in hemoglobin is not a regular ascent but subject to marked variations in the same individual. It may fall just after the beginning of treatment, or fall after rising considerably, then continue to rise. In the above 423 cases at some time during their course, 45 rose after falling more than 3%, and 38 fell more than 3% after having risen. Had those of the latter group and the 45 which lost, been taken later, they might have shown a net increase.

This irregular course was also manifested by the special cases in the Appendix. In 42 of them, the hemoglobin reached 85% or above, averaging 100.38%. A weekly rise of 20 to 30% was not uncommon and in case 58 it rose 42%. The patients looked and felt correspondingly improved. We believe two factors may be here engaged. (1) That the blood regenerating organs, working overtime to offset the hemolysis and being suddenly relieved of much opposition by the removal of a large number of parasites, produce a rapid actual increase. (2) While not agreeing with Boycott and Haldane that there is simply anemia from dilution of the blood, yet it would seem from their experiments that there is more or less increase in the volume of the blood, and that during progress of cure this condition is more or less rapidly remedied, producing a relative increase.

The hemoglobin falls before the red cell count and may even reach 30% before much change is noted in the reds. In all special cases, the average color index was .5, taking 100% hemoglobin and 5,000,000 red cells as normal. In only one case was it above normal, i. e., case 26, color index 1.1.

Under treatment, the hemoglobin is usually outstripped by the red corpuscles, especially if the former rises slowly. In some cases they move parallel. The influence of a few parasites over the hemoglobin is widely different in different persons. In some, it will rise but little until all worms are expelled, even a few, not sufficient to show ova in the stools except on repeated examinations, may keep it down. We have repeatedly observed a rapid rise after thymol under these circumstances. On the other hand, the normal may be attained while the fecal specimen yet shows an occasional ovum.

Red cells. Estimations were made with the Thoma apparatus, counting 180 squares and using a dilution of 1:200 Gower's or Toisson's solution, and counts were frequently repeated when they seemed disproportionate. The procedure occupied too much time as a routine practice upon outpatients. In the 61 special cases, the average count on entrance was 2,406,416 per cu. mm. The lowest was 754,000 in a case that died, but case 38, with 880,000, recovered, reaching 5,354,000 in ten weeks. Case 57, with 5,025,600 was the highest on entrance.

Taking all grades of the disease as encountered in Porto Rico, this average is too low, as our experience has been that the reds are relatively less decreased in the milder cases.

As the anemia progresses, the cells become polychromatophilic and show poikilocytosis. We have never seen these conditions absent in severe cases. Macrocytes and microcytes are constantly seen in such cases, and while, as a rule, the latter are more numerous, the former predominate in some cases, and with oval forms or megaloblasts present a picture very suggestive of pernicious anemia. Cases 12, 17, 25 and 59. Appendix) The assertion has been made that this secondary anemia may become pernicious; these megaloblasts, however, are seldom very large.

Normoblasts are fairly common and in many instances increase while megaloblasts show a tendency to diminish under treatment.

Macrocytosis also gives way to microcytosis as improvement is noted. Extremes in size of both classes were often seen in bad cases.

The production of red corpuscles proceeds rapidly, reaching and exceeding normal some time before the hemoglobin. In the 42 cases with a final average hemoglobin of 100.38%, the average of the final red cell counts was 5,624,197, the excess being due, in all probability, to the microcytosis still present in some of the cases.

In general, when the hemoglobin rose rapidly, the red cells kept pace with it, but sometimes, as in case 39, the ascent is periodical.

The Leucocytes. We are still unable to find a leucocytosis. In the majority of cases, the number of these cells lies somewhere between 5,000 and 10,000 per cubic millimeter, and often in chronic cases of long standing, there is leucopenia. There is generally some other reason for a leucocytosis, save in certain cases toward the end of their convalescence. It may be seen where mazamorra has produced extensive eruption, or an increased volume of the blood may influence the count as in the case of red cells. Our average white cell count of 61 cases was 8,009 per cmm. on admission, and on discharge, the average of the 42 cured was 9,041; of the 16 improved or practically cured, 7,533; of the three patients who died, 14,133 per cmm.

The differential counts of leucocytes were made in the usual manner. Jenner's stain was used and gave excellent results. It is one of the best stains to use in these countries where the light is strong and humidity great, as it keeps better than any other we have used. Wright's, Leischman's, and Goldhorn's stains should also be as easily preserved, but we did not have them at hand at the beginning. The Ehrlich triacid stain and various others well-known are rapidly destroyed. The evident advantages of a combined staining and fixing solution in such work as ours will be appreciated, for time was valuable and our laboratory was provisional.

Only 250 leucocytes were usually counted but it is believed that this number gives an exceedingly close estimate of the actual percentage.

In marked cases, there is a decided degeneration of leucocytes in this disease. This was most marked in eosinophiles but very common in polymorphonuclear neutrophiles and in large lymphocytes. Pale, shredded cells were found, nuclei without protoplasm and with only a few granules to distinguish the neutrophile, vacuolated nuclei, fragmentation of nuclei, etc. Not only this, but frequent instances of mitosis (or apparent mitosis) in both eosinophiles and polymorphonuclears were noted. Neutrophiles were sometimes undersized and bereft of granules or oversized with large granules.

Eosinophiles. The chief interest centered around the eosinophiles. There is no doubt that the following conclusions may be drawn with safety; (conclusions which, by the way, were suggested in the report of the Ponce cases in 1903):

1. Very severe chronic cases with poor resisting power and exhausted blood-making organs have little or no eosinophilia. In applying this to our special cases, it should be remembered that many of them were probably the subjects of a severe acute infection superimposed upon a chronic uncinariasis of unknown severity. Leichtenstern's remarkable case of 72% eosinophiles just before death does not negative this view. We had a case (33 of the special cases) which died in coma possibly due to cerebral effusion. This child was admitted with 6.4% eosinophiles and died with 20.8%.

2. A rise in eosinophiles is of good prognostic import. Especially is this true of those who, admitted to treatment with conditions described under "1," begin to show higher and higher eosinophile counts. There are such cases, not explicable to us, where in spite of a lack of rise in these cells, improvement does take place. It may be rather rapid but is generally very slow.

3. If very severe cases, presenting little or no eosinophilia, fall in their eosinophile count, the prognosis is not generally good.

In general, good resistance to the toxin of uncinaria is expressed by eosinophilia. Our special cases, being nearly all very severe, give an average of 10.8% eosinophiles before any treatment was begun, and the ultimate percentage of these cells after all treatment had been concluded was 13.2. As 42 of the 61 were completely cured at that time, and 15 were nearly so, it is clearly seen that the number of uncinariæ per se has nothing to do with eosinophilia *directly*. As to the oft-cited remark that eosinophilia and Charcot-Leyden crystals increase and fall together, there are cases (Appendix) which fail to show such relation.

The eosinophiles behave in a most extraordinary way in the course of cure. There seems to be a general rise to a certain percentage, varying according to the individual, after which a fall to normal takes place. This fall to normal may occur before the patient reaches a normal hemoglobin percentage or may be delayed until some time after cure. In this course of rise and fall, great undulations may take place in the curve, which as yet seem to be difficult to explain.

Some very pertinent questions arise in consideration of the question of eosinophilia:

1. Is it an evidence of blood regeneration, of increased activity of blood-making organs ?

2. Is is that eosinophiles are directly concerned in the defense of the organism against the toxin.

There are many other theories concerning eosinophilia in general, for instance, that of Weiss who, Ewing says, maintains "that local eosinophilia tends to occur where there is extensive extravasation of blood, the derivatives of hemoglobin being absorbed by the polynuclear cells and deposited in the form of eosinophile granules".

Eosinophiles are almost always larger than normal. Sometimes they are very large and tend to degeneration, apart from their evident fragility seen in preparation. The granules are also very large. Myelocytes are more frequently eosinophilic than neutrophilic.

Lymphocytes, large and small. In our counts we have preferred Cabot's classification to Ewing's, from motives of convenience, there being apparently no essential question involved as to increase or diminution of the percentage of "large mononuclear leucocytes". All lymphocytes were called "small" if below ten microns, in diameter and all "large" if larger than this. There seems to be a decided tendency to increase in the proportion of large lymphocytes in some cases.

"*Türck's cells*", or "stimulation cells", were not looked for at first but were counted as lymphocytes but in two or three weeks after beginning our special cases, we began to note them and many fine specimens were seen. Their great irregularity in appearing does not lead us to think that any deductions can be made concerning them in this disease.

Myelocytes, appeared from time to time, generally eosinophilic.

Basophiles, appeared to be increased at times.

Basophilic granules often appeared in other leucocytes, especially in lymphocytes.

In general conclusion, we cite the average percentage of the four chief classes of leucocytes in twenty-nine cases before treatment was begun, and in which 10% of eosinophiles or over was observed:

Table 17.—

Eosinophiles	17.1
Polymorphonuclears	54.5
Small lymphocytes	16.3
Large lymphocytes	8.6
	96.5
Other leucocytes	3.5
	100.0

According to Ewing, the total lymphocyte count may vary, in normal blood, between 24 and 29; according to Cabot, between 24 and 38. Our total is 24.9 which rather approximates the lower than the higher limit but is still within normal. Our percentage of small lymphocytes is lower than normal according to both authorities and our percentage of large lymphocytes is decidedly above the maximum of normal, according to Ewing. Therefore it would seem as though the large lymphocytes had gained at the expense of the small.

The polymorphonuclear neutrophiles seemed to have lost decidedly [normal, 62 to 70% (Cabot); 70 to 72% (Ewing)], and the eosinophiles to have gained about what the first-named have lost. As will be observed, there is generally no eosinophilic leucocytosis.

COURSE, PROGNOSIS, AND LETHALITY.

In cases where a moderately heavy infection takes place, and the patient is young, resistant, and has the benefit of wholesome food and good care, a certain degree of anemia results which, as a rule, gradually wears off as time goes by, *provided;* that no new infections are engrafted upon the first. Such cases are rare here, for in Porto Rico, the country people, who form the mass of anemics, are very poor. They are limited to the confines of a narrow valley, a coffee plantation on a mountain side, or a sugar field. They are constantly open to reinfection and lead a life of chronic invalidism. In their half-sick condition they become dispirited, indolent, and thoughtless of the future. Before long, food gets scarce for lack of strength to procure or produce it. The family is large, and the man, the bread-winner, falls ill. He becomes edematous and dies, leaving his wife and children to work out their own precarious salvation. Many times this varies; the children go first, or the wife dies of the disease itself or of childbirth, its dangerous complication.

They live far from town and to reach them the municipal physician has to risk life and limb over rocks, mud, steep mountain trails, and swollen streams. Many times they are never reached in time of illness, and the disease has become such a curse that it is known by the jibaro as "la muerte natural" (the natural death).

It has been said that but a small per cent of the deaths recorded as due to "anemia" are really due to any such thing. We are emphatically of another opinion. The jibaro knows his disease better than his educated countrymen who rarely have it. He dies of "hinchazón" (general edema), is "descolorío" (pallid), and the picture he draws is so faithful that we have come to rely upon it. Such deaths are recorded as "anemia" by the "comisario," the chief of the barrio, and are so entered in the register. Apart from this, how many are able to trace deaths from cerebral edema, generally reported as "perniciosas" (pernicious malarial fever), or the final diarrhea or dysentery, etc., often the closing scene in uncinariasis? It would be startling to one not familiar with the disease here, to listen to the story of destruction that "anemia" has made in the families of these unfortunate people. No one denies that it is the most fatal affection in Porto Rico. In the United States and Europe, the number of deaths from uncinariasis is exceedingly small but here the mortality is something terrible. Our own estimate of it is that it causes about 30 per cent of all deaths, and the Superior Board of Health has recorded from 20 to 30% in times past. Many authors who have only the morbidity resulting from infection to deal with, would be shocked to see to what extent its lethality may come. We see by published reports from both continents that what we have regarded here as light infections, have been considered heavy there. The essential feature is the number of worms contained in an individual more than all other modifying factors put together. For this reason, it is natural that one should not be surprised that there are but few cases beyond hope of cure, even in the absence of the comforts of life.

A return to health is liable, however, to be followed by reinfection and a subsequent descent to the same condition. We realize that some immunity is conferred by one attack but this is powerless before the tremendous infections these people incur. This has already occurred in some of our cured cases in Bayamon and will continue to occur. So, until a determined effort to educate, direct, coax, or compel the use of some form of latrine, and a general intelligent crusade is begun, in which the infected are treated, uncinariasis, or "anemia", as it is popularly known, *will continue to reduce the white and mixed inhabitants forming the country class of the island, to a lower and lower grade, mentally, morally, and physically, until the very existence of the class will be threatened.*

We have purposely detailed our views and the facts on predisposing causes in order to show how it is that the majority are lulling themselves into a fatal security in citing "causes" which are not such and which merely aggravate the disease.

In order to get better food, people have to work for it and these people are not usually capable of such labor in their present condition. So much for the general course of the disease in Porto Rico, which is seen to result in an increasing enfeeblement of the laboring classes.

In considering the course of typical individual cases, we refer to symptomatology and our recorded cases in the Appendix. It is a gradually deepening toxemia, until the last stages arrive in which the patient, unable to get about from debility, edema, etc., lies down in his hammock or wherever he may be, exhausted, swollen, with a dilated and failing heart, and succumbs. Such cases were brought to the hospital in hammocks swung on a pole carried by two men, and a "hammock case" became a synonym for a patient in the very grave stages of the disease.

In such cases, general anasarca was usually manifest and extreme, often with edema of the lungs, enormous ascites, dilated heart, and pericardial and cerebral effusions.

Obstinate diarrhea frequently marks a fatal termination. Sometimes the heart symptoms, with emaciation and diarrhea, are the prominent features, and such cases are of bad prognosis. The patient as a rule dies of pure exhaustion.

On the other hand, the subject's surroundings, his resistance to the toxin, and his relatively moderate degree of infection may prevent him from any further inconvenience than the effects of a moderate anemia, indigestion, and certain nervous symptoms, with periods of improvement and of advance of the disease. He may thus lead a life of semi-health, working a few days and resting a week.

The prognosis is dependent, at least to a considerable extent, on the presence or absence of eosinophilia, as discussed under the chapter on pathology (page 84). Especially dangerous is pregnancy, and abortion, premature labor, and miscarriages are many times observed. Childbirth is often the cause of death of anemic women, although not so frequently as might be supposed, and if stillbirth does not result, the offspring is apt to be poorly developed and liable to marasmus. Barring intercurrent diseases, the prognosis is good in the light, moderate, and even severe grades of the disease, provided no additional infections occur, but in the extreme grades, even under treatment, the outcome is dubious.

COMPLICATIONS.

They are numerous, but severe gastritis, dilatation of the stomach, entero-colitis, and dysentery (amebic or Shiga) are the most frequent. Edema of the lungs, dilatation of the heart, ascites, neurasthenia, etc., mentioned under symptoms, should be considered as such as they are with difficulty isolated from the other manifestations of uncinariasis.

SEQUELÆ.

These are permanent lesions of heart, liver, and kidneys (the latter according to Scheube), due to fatty degeneration. Rarely, endocarditis and sclerosis of the aorta occur; aneurism is not frequent in Porto Rico. Neurasthenia is common : paresis or even acute mania may result. According to some authors, pernicious anemia may be a sequela. Leukemia has been mentioned but we have never seen it result from uncinariasis. Lopez Gaztambide found one case in Arecibo with 145,000 leucocytes per cmm., of which he kindly sent us a blood specimen. The frequency of cataract in anemics here has been discussed.

INTERCURRENT DISEASES.

Only the more common ones will be mentioned in detail. A list of such others as came under our notice in our clinic will be given with the number of times observed.

Malarial fever. This is a serious complication and, when it occurs, the combination is apt to be fatal if continued any length of time. Case 6 (Utuado series, Appendix) was an instance of the intercurrence of this disease. In India, it was believed by Giles that Kala-azar was malaria plus uncinariasis, and he states that its appearance in a village would cause people to flee for their lives, leaving home and haunts. Here in Porto Rico, tertian benign fever is the usual form encountered but we have found several cases with the typical ring forms, crescents, etc. of the estivo-autumnal variety. In Ponce, one of our cases, nearly cured of uncinariasis, was suddenly seized with pernicious malarial fever which was rapidly fatal. Other physicians here cite pernicious forms, especially in Ponce. While malaria is not rare, it is not as common as in many tropical sections not considered to be especially malarious. We have seen two cases of "ague cake" previous to our present investigation, but of the entire number since that time (5,500), only 16 cases of malaria have been observed, some of these due to the estivo-autumnal variety. It seems to be comparatively infrequent in the mountains where anemia is most seen.

It may be of interest to note the results of treatment by thymol of five cases of uncinariasis complicated by malaria, in which the hemoglobin was estimated before and after the administration of the drug:

Table 18.—

1.—Hb.	30%,	March	8th	55%,	April	25th
2.— "	74%,	"	9th	84%,	"	27th
3.— "	42%,	"	16th	46%,	"	27th
4.— "	32%,	"	21st	70%,	"	28th
5.— "	47%,	"	14th	80%,	"	24th

Syphilis is a relatively rare disease among the people of the mountains, and care should be taken not to confound ulcers resulting from mazamorra, with tertiary lesion.

Tuberculosis. While this is found to be the scourge of the towns and hamlets it is very fortunately not so frequent among the country class. If one in a family acquires it, the whole family is apt to become infected. We noted twenty cases in all, but the incipient form might have escaped us. Uncinariasis creates a strong predisposition to the disease and to sow it on such soil is to ensure a rapid and fatal termination. In spite of the few cases seen, this disease was our greatest enemy in treatment, as will be seen from the deaths chronicled in the Appendix. A common form is tuberculosis of the testicle.

Pseudo-rheumatic affections. What may prove to be a serious condition in Porto Rico is the invasion of the blood by a bacillus. All mention of a bacillus in the blood in our special cases has reference to this organism. It was first noticed by Dr. Gutierrez, on June 9th, while examining a differential specimen of case 41, special Utuado series, and large numbers of this bacillus were constantly present in additional examinations of the blood of the ear and the serum of the foot. She was then suffering with great edema, fever, and rheumatic pains. A pure culture, made under rigid precautions, was subsequently found to be the same as others taken from individuals suffering from a like set of symptoms, irrespective of anemia. In one case, there was 91% of hemoglobin and decided edema almost reaching anasarca, with fever and joint pains. In all these cases, neither albumin in the urine, nor heart lesions could be found. We have seen curious instances of localized edema with fever in persons not infected with uncinariæ and of good station in life, where the same bacillus (morphologically) was found. Case 44 of the series reported in American Medicine, Sept. 5th and 12th, 1903, had a fusiform edema of both legs, not extending to the ankles, which greatly puzzled us. It disappeared after a time. The Commission is not prepared to give its classification. We are indebted to the laboratories of the Army and the Public Health and Marine-Hospital Service for assistance in studying this micro-organism.

Animal parasites. The following list embraces all animal parasites encountered in our cases at Utuado. The majority were determined from the characteristic ova in the feces but the number of persons so infected under each species is low compared with the actual facts. Especially is this true of ascaris lumbricoides and bilharzia hematobium, the first not having been always noted, the second frequently not sought for, as when a sufficient estimate of the number of ova of uncinaria was made, search was concluded. They are believed to be a far more common diseases in Porto Rico than the figures indicate. Bilharziosis recti is particularly common and is frequently unaccompanied by blood in the feces. There is often, however, a large amount of mucus seen in the stools. In many cases known to be heavily infected with bilharzia, there are periods in which no ova can be found, and on account of this fact, amply demonstrated in several of our cases of bilharziosis, we conclude that we have passed over many such in our daily clinic. In one of the cases (case 42, Appendix), fasciola hepaticum was unsuspected but one adult parasite was found at post-mortem by Dr. Gonzalez Martinez. Special cases are not included.

Table 19.—

PARASITE.	In combination with uncinaria alone.	In combination with uncinaria and other parasites.	Total.
Ascaris lumbricoides	1,199	209	1,408
Tricocephalus dispar	155	171	326
Strongyloides intestinalis	25	11	36
Balantidium coli	8	6	14
Bilharzia hematobium	16	5	21
Oxyuris vermicularis	1	2	3
Diplogonoporus grandis	1	0	1
Ascaris canis	0	1	1
Ameba coli	1	2	3
Fasciola hepaticum	2	0	2
Tyroglyphus longior	2	0	2
Tenia saginata	3	0	3
Tenia solium	1	0	2

The following numbers of cases of various intercurrent affections were seen:

Table 20.—

Pellagra.........1
Pneumonia.......1
Laryngitis.......1
Paresis...........1
Varicella........1
Elephantiasis....2
Jaundice........4
Tonsillitis.......1
Filariasis.......8
Conjunctivitis ...1
Hemiplegia......1
Renal calculus...1
Scabies...........2
Ulcer stomach...1
Marked trachoma.2

In one case of jaundice, the stools contained ova of fasciola hepaticum and the urine was chylous, the latter probably due to a concomitant filariasis.

DIAGNOSIS.

This should usually rest upon the careful microscopic examination of the feces. There was a time in our work in Utuado, when for about six weeks, the three of us (later four) made from 300 to 600 of these examinations a day. This is excessive and beyond endurance if continued for any considerable length of time, especially when other duties are imposed.

Table 21.—

Examined once		339	persons	....	339 times
" twice		668	"	....	1,336 "
" three	times	1,011	"	....	3,033 "
" four	"	862	"	....	3,448 "
" five	"	837	"	....	4,185 "
" six	"	392	"	....	2,352 "
" seven	"	201	"	....	1,407 "
" eight	"	110	"	....	880 "
" nine	"	44	"	....	396 "
" ten	"	13	"	....	130 "
" eleven	"	3	"	....	33 "
" twelve	"	1	"	....	12 "
" thirteen	"	1	"	....	13 "
		4,482			17,564

To these should be added about 4,500 more for our special cases and our cases in Bayamon, a total of over 22,000.

The ova. These are characteristic, and the only thing liable to be confounded with them are the ova of ascaris lumbricoides, stripped of their heavy bile-stained outer shell, but these latter have double contour and contain a shapeless mass of granular matter, not differentiated into clear segments. The ova of uncinaria americana are "ellipsoid, 64 to 76 microns long by 36 to 40 microns broad, in some cases partially segmented *in utero*, in other (rare) cases containing a fully developed embryo when deposited." (Stiles).

The ova of uncinaria duodenalis are "ellipsoid, 52 to 60 microns by 32 microns, laid in segmentation" (Stiles). In one case in Bayamon an ovum was encountered, in every respect typical of uncinaria americana, except that it was double the size, with segments proportionately large. The two varieties are practically the same in appearance, excepting size. They are clear and chitinous-shelled, with grayish, finely granular vitellum balls, generally from four to eight in number. If segmentation has progressed further, the specimen is apt to be old. In such cases, the embryo, moving about in the shell, has often been observed but this is a change which usually occurs outside the human host, as we know of no instance where the ovum has hatched in the intestinal canal. When free embryos are seen, they are generally those of strongyloides intestinalis. For a more exact differentiation of the ovum some work on zoology should be consulted. Suffice to say, that ova of uncinaria are not generally bile-stained but clear, whereas those of the commonly associated intestinal parasites are of a yellow to a deep amber or brown color. A beautiful permanent specimen may be obtained by staining a thin smear of feces with Jenner's stain or with one of its modifications. From 300 to 500 females produce about 1,000,000 ova a day and, as these are laid high up in the intestinal canal they are found quite evenly distributed throughout the entire fecal mass. On account of this even distribution we may estimate the number of adult female worms by the method of Leichtenstern who divides the number of ova contained in one gram of feces by the factor 47. A convenient method described by Grassi and Parona, is to mix one part of feces with three of water. A decigram of this (nearly three drops) on a glass slide, ruled into squares containing four milligrams of this liquid, will enable us to estimate the total number, reasoning from the fact that 20 ova per milligram of the diluted feces indicates 480 females. The number of males are to females as 1: 3 or 1: 4.

We desire to call attention to some facts which very much invalidate the results obtained by such an estimate of the number of parasites.

1. The small intestine at the site of the parasites is usually covered with thick mucus. If this mucus comes away *en masse* our computation is incorrect, as we have seen mucus rich in ova while the pure fecal matter contained a relatively small number.

2. For some reason it is much more difficult to find ova in a diarrheal stool than in one which is formed.

3. As will be seen from an inspection of our cases reported in the Appendix, many patients, containing large numbers of parasites, at times failed to show ova in the feces, and this apart from such circumstances as recent infection, reinfection, etc. Suspended ovulation due to the administration of the anthelmintic seems to occur and to last for a considerable time, after which ova reappear in the stools. Many of these cases may have been due to the maturing of a fresh group of

parasites, for suspended ovulation does not always supervene, or lasts, but a very short period. For instance, we have had cases in which ova were seen in abundance two days after a full dose of thymol.

A most peculiar fact recently established by Dieminger seems to point also to suspended ovulation due to sickening of the worm by substances other than the usual anthelmintics. He noticed that when men were drinking hard, no ova, or at least only a limited number, were found, whereas on other days they had appeared in great numbers. He examined 21 men on Monday and found only four infected; on the following Friday he found ova in great abundance in eleven who had previously shown none. In another instance he found a man heavily infected on Saturday but on the following Monday, he could find nothing at all after repeated search. The reason he assigns is that Sunday was spent by these men drinking to excess. He states that ingestion of salt herring will also reduce the number of ova.

Technic of microscopic examinations. A bit of feces the size of a match head is removed with a toothpick and placed on a glass slide. Upon this is placed a thick coverglass and compressed so as to give a clear center to the specimen. In manipulating the cover class, rubber fingercots are desirable in case of accident. The addition of water is to be deprecated and should be used only when absolutely needful to secure a spread, as it obscures the field by a fine precipitate, and delay results. This specimen is best examined under a ⅓ or ⅔ objective, and a number 4 ocular. Some prefer the one-sixth but here again, valuable time is lost and the field is not so clear nor so large. Too much light must not be employed as the delicate ovum will be passed over. The thinner parts of the spread should be first examined. Generally here in Porto Rico, from one to two minutes sufficed for the entire proceeding at the first examination but in cases where more than one specimen must be prepared, the use of the mechanical stage is invaluable. When this procedure gives negative results in a suspicious case, the feces should be sedimented, when a still greater surety may be secured. We have used the centrifuge with good results.

Finally, failing in all else, the patient should be given a dose of beta-naphthol. If the feces are washed as described by Stiles, and placed in a flat dish with water, the characteristic worms may be found. All feces passed within twelve hours of the last purge should be examined. This is really the best procedure in absence of ova and, in most cases, is entirely justifiable. It is important to remember that if a purge is not given after the anthelmintic, no evacuation of the bowels may occur in time to find the worms, for in twelve hours they may be digested in the intestinal canal, and as a consequence not found in the feces. Thus the lack of a microscope will not excuse the witholding of appropriate treatment, for beta-naphthol is harmless and the worms are visible to the naked eye. Quinine is administered on flimsier evidence than that presented by the anemic jibaro of Porto Rico.

If all examinations of feces are impossible, then beta-naphthol should be used every week for four doses. In that time the patient's improvement will tell the story without need of further examination. This therapeutic test can be applied in the majority of the anemic country people with a fair certainty of success. It is not scientific, and the microscope should be the criterion but between letting a man go without even a chance, and trying a crude test, is a choice of evils. The opportunity is here seized to emphatically recommend that such treatment should never proceed from any one but a doctor of medicine. Among those anemics not liable to have been infected by uncinariæ, microscopic examinations should *always* be made. We consider the clinical picture as seen here very suggestive but we do not forget that cases of profound anemia from other causes will make such a diagnosis as uncinariasis precarious. Moreover, there are concomitant diseases which may keep up severe anemia. Still further, we may expel all parasites and leave organic diseases of heart, liver, and blood-making organs (the result of previous infections) to work out a fatal effect.

The suggestive clinical features of uncinariasis are: History of one or more attacks of mazamorra, remembering that the mazamorra of the better classes is not always the mazamorra of the jibaro; pallor, using the conjunctivæ as the best guide; hemic murmur; pain in the epigastrium with large appetite and still with decided digestive disturbances; meteorism; lack of pronounced diarrhea; palpitation of the heart; dizziness; pain in the chest without cough; and a passive, indifferent, stupefied or preoccupied condition of mind. For those who have the instruments but who for some reason have not examined the feces, low hemoglobin percentage, low color index, and, in certain cases, presence of eosinophilia, make, with the clinical symptoms, a still more suggestive picture. In brief, uncinariasis has been defined as a profound anemia without apparent cause. We should be inclined to add that, in so far as Porto Rico is concerned, all anemias in which sufficient cause cannot be found, should be subjected to some test to determine the presence or absence of uncinaria.

As to diseases with which uncinariasis is confounded, we will only refer to the more prominent ones with which a physician in this Island will have to deal.

Malaria. Malaria can be most accurately diagnosed by the microscopic examination of the blood. The absence of the parasites from the circulating blood in one examination does not preclude the possibility of the presence of this micro-organism in the internal organs, but once found, the evidence is conclusive. Generally speaking, malaria is not a very common disease in Porto Rico but in certain localities in the island (as Salinas), it certainly is. There are few persons who will not say that they have at some time had "malaria" but it is a popular diagnosis for fever in any form. Indigestion, autointoxication, enteritis, "colds", typhoid fever, filiariasis, etc., are often embraced in this all-sufficient word. Malarial cachexia is really rare. This is a condition which in the south of the United States used to be almost universally confused with uncinariasis and other diseases.

Tuberculosis. In its incipient stage, where diagnosis is most important, the microscope is almost indispensable, unless we are peculiarly gifted in physical diagnosis. But anemia in incipient phthisis is oftener absent than present although pallor is frequent. Only when a cavity exists is it that marked anemia from tuberculosis may be expected, and this does not always occur.

Syphilis very frequently produces extreme anemia in the secondary stage and should be carefully looked out for.

Diarrheal diseases and Dysentery, when chronic, often produce considerable anemia, sometimes severe.

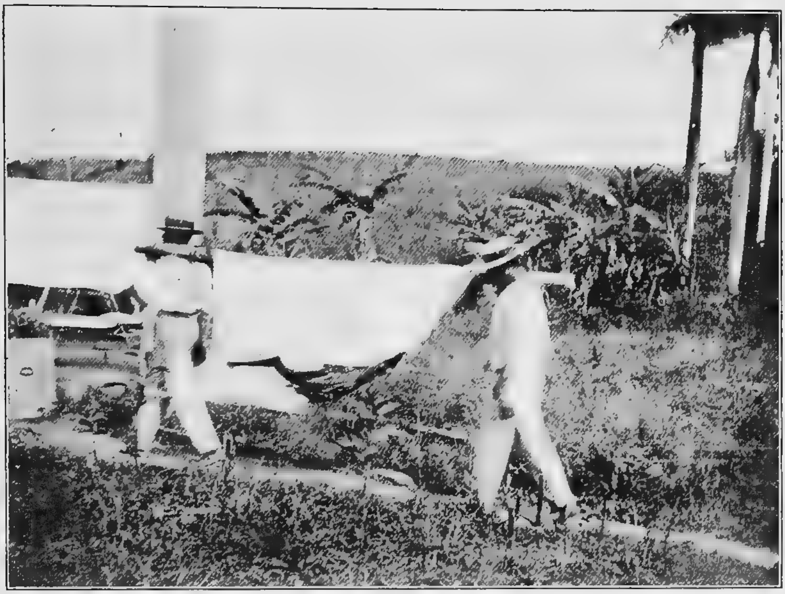
Pernicious anemia. This is a very rare disease; none of us has ever seen a case in Porto Rico. The high color index with preponderance of megaloblasts over normoblasts should be sufficient to exclude it.

Pseudo-anemia. We were visited by large numbers of persons in the better walks of life, who desired treatment for "anemia" because they were pale. In many, it was nothing more than the normal complexion of persons living in the south of the continent; in others, the lips were pallid and symptoms of neurasthenia were present. In none of these was anemia found if 85% is to be considered the lower limit of normal hemoglobin, according to the von Fleischl apparatus. Most of them had over 100%. On the ground of this complexion and occasional pallor of lips, which is usually transitory, we often hear that "everybody" in Porto Rico is anemic. Persons from temperate zones frequently note a loss of ruddy color, to a certain extent, after a few years residence here (or much less) but many never lose their color. Those who do, say they are "nervous and run down" and we are inclined to view this phenomenon as more nervous than organic.

Stengel says: "It is very well known that certain individuals of the same family present marked pallor without exhibiting evidence of anemia in a clinical way or upon the most careful examination of the blood. * * * The explanation of such cases is found in the study of the general circulation. Sahli found among the causes of such 'apparent anæmia' reduction in the blood pressure with consequent deficiency of circulation in the skin. In other cases, disturbances of the vaso-motor system doubtless play a part. * * * In these instances there is a sudden or gradual accumulation of blood in the interior with reduction of the amount customarily present in the skin. The consequence of this is an anæmic appearance without actual anæmia."

In general, diseases which have been cited as productive of anemia do not so frequently produce profound anemia as is thought. Referring again to Stengel: "Taking blood examinations of 100 consecutive cases of gastric, intestinal, cardiac, nervous, and pulmonary diseases in which a certain degree of pallor led to examination of the blood, I found the average percentage of hemoglobin to be 74%". This is 30% higher than the average hemoglobin percentage of anemics here.

It is notable also that be considers 40 to 50% a severe anemia and 50 to 75%, moderate.



METHOD OF BRINGING IN VERY ILL PATIENTS. HAMMOCK CASE.
CONDUCCIÓN EN HAMACA DE UN ENFERMO GRAVE.

INTERIOR OF A HOSPITAL TENT.
INTERIOR DE UNA TIENDA-DORMITORIO.

PROPHYLAXIS.

Many suggestions have been made to us, and we have reviewed a large amount of literature on this phase of our labors. Some of the plans have been already proven worthless, some of doubtful value, others not applicable to peculiar conditions existing in Porto Rico, or they have too limited an application. The experiments referred to under etiology, show how useless or impracticable are all attempts at chemical disinfection. Boiling or filtering the water is not necessary, as the chances for infection by this agent are negligible. The coffee plantations are, in Porto Rico, the most heavily infected places, yet the ground cannot be plowed or burned off.

We are, therefore, left two points of attack, i. e.:

1. Prevention of soil-pollution.
2. Treatment of existing cases.

Prevention of soil-pollution. The methods pursued in Germany (taking for example the country foremost in this line) to accomplish this end, only indicate in a general way those to be employed in Porto Rico. Instead of the infection being confined to mines, brick-yards, etc., it is here spread over the entire Island, an area of 3,668 square miles, populated by about one million people scattered throughout the hilly interior, often isolated many miles from town. Here they eke out a miserable existence, victims of their insidious illness which they neither know how to avoid nor cure.

Remarkable indeed are some of the precautions they take to avoid certain diseases, for example, it is no uncommon sight to see people carrying an umbrella on a clear night to keep the dew from an injured finger. If the danger of soil pollution could be so engrafted upon their minds, half the battle would be won.

Every possible means should be used to disseminate the facts among these people. A small pamphlet written in simple, plain language should be published and so generously and repeatedly distributed throughout the island that no house should be without it. Illiterate as most of them are, they would find some one to read and discuss it, for it is, to them, a matter of life and death, and they know it. This pamphlet should explain the cause of their affliction, how, by defecation upon the ground, the ova of the parasite are spread about, how they develop under the proper conditions of temperature, dampness, and shade, and how the larvæ gain entrance to the human body and produce the disease. The necessity of latrines should be made very clear.

A suggestion of Dr. A. Stahl affords another excellent means of reaching them. It is that the teachers in the schools, especially in the country and smaller towns, should assist in the promulgation of this sanitary doctrine, not only among their pupils but wherever they can. The Insular Police stationed in the country districts could exert a powerful influence by authoritative counsel. We know of one, a former patient, who announced his intention of doing what he could. Indeed it is not surprising that those who have been cured should become enthusiastic in this work.

If the above propaganda be thoroughly carried out there would be no necessity for a law requiring the construction of latrines for every house. The effect, however, would be less felt in some circumstances, and compulsion should be used if necessary to have latrines, either portable or fixed, in coffee plantations, sugar plantations, public works, etc., wherever large or small bodies of workmen are congregated. In connection with this idea, and for the benefit of those who believe that the country peon will pay no attention to such advice, we were told that, as a result of our labors in Utuado, the workmen employed in road building annoyed the foremen by demanding latrines near their work.

Latrines may be of the simplest form, practically without cost except for a little labor. A hole in the ground surrounded by a thatch or bark lean-to is sufficient. When nearly full, it can be covered with earth, and another dug. When working in the field, the laborer is scarcely ever without his hoe or machete which could be used for covering the excreta voided there of necessity.

Treatment of existing cases. Each person who harbors this parasite, whether suffering from anemia or not, is a focus of infection to others; hence the reduction of these foci becomes a most important prophylactic measure, and it should be emphasized that the slight cases are the most dangerous because they often do not present themselves for treatment, but must be sought out The present system of municipal aid is entirely inadequate to accomplish the results desired, as the municipalities lack sufficient resources; some have no physician, nor even medicines. Thus, of necessity, it becomes the imperative duty of the Insular Government to take hold of this work with decision and energy.

The demand for assistance and treatment for sufferers from this disease is already being felt in those districts where the Commission has worked, and proves the efficacy of the plan instituted. But these municipalities cannot pay for necessary professional attendance, supply medicines, nor even house in their small hospitals the numerous grave cases that exist within their boundaries. Moreover, this demand will soon spread through all the island as it is already noticeable in those parts where the efforts of enthusiastic physicians are combatting the disease with brilliant success, although having but limited resources.

For these reasons, the Commission believes that a methodic and scientific organization sustained by the Government and cooperating with the municipalities in their charitable institutions, will be the most feasible plan of operation and give practical results.

This organization could be confided to a commission that would establish a central station with a small portable hospital annexed, remaining a specified length of time in each district, and locating branches in suitable places until there would be formed a complete system of dispensaries and hospitals for the exclusive treatment of this plague.

Having indicated the lines along which the Commission believes preventive measures should be taken, it is not within our province to discuss the question of expense nor where shall be found the necessary funds for this work. While not losing sight of the economic condition of the country, the sanitarian and physician, face to face with the evil which they have to prevent and cure, should not, indeed cannot, compromise to financial conditions, their prophylactic ideas founded upon scientific facts. It remains for others to harmonize the exigencies of "Salux populi suprema lex", with the precarious state of the contingent of affected who constitute, in Porto Rico, 90% of the rural population.

As Rome was not built in a day, neither can success be rapidly attained in the elimination of this disease from Porto Rico. The measure of results will depend upon systematic and continued hard work, begun gradually and extended as rapidly as consistent with efficiency.

It will require years to accomplish the perfect result, but the interest on the labor and money expended will not be so long delayed, as each year will return multiplied benefits in the form of lowered death-rate, increased efficiency of the laborer, reduced demands upon public charities, etc.

TREATMENT.

The object of treatment is, of course, to remove the cause by expulsion of the parasites. In many light and moderate cases, this will suffice but in old chronic cases and in those where the disease has reached a severe grade, some regenerative treatment should follow the specific.

There are only three drugs worthy of serious mention: thymol, male fern, and beta-naphthol.

Thymol. This was first used by Bozzolo in 1880. It is preferred to male fern in the United States and England. Sandwith says he "went through a weary apprenticeship of failing to get rid of the parasite with other drugs."

In our work, the mode usually adopted in its administration was the following:

In the evening, a dose of either magnesium or sodium sulphate was exhibited. In the case of the latter, a less nauseous draught, 30 grams seemed sufficient, for to give more would be to often precipitate a too exhausting diarrhea. The object to be attained is the emptying of the bowels so that the anthelmintic will act upon an exposed intestinal mucous membrane. On the next day, the patient is kept in bed without food until 1 P. M. and is given two grams of finely powdered thymol in capsules at 8 A. M.; at 10 A. M., this dose is repeated, and at 12 M., another purge of the salts. This was the method employed in our outpatients, but in our hospital we have occasionally deviated from it in order to compare the efficacy of thymol with that of other drugs. We believe that the second purge is needful because it is not desired that thymol be absorbed, and sodium or magnesium sulphate is an antidote. When a soluble sulphate arrives upon the scene, all the damage that the anthelmintic is going to do to the worm, has been done, and from that time it is proper to hurry the drug out of the intestines. For the same reason, we warn against all solvents of the drug while it remains in the digestive canal. Such are alcohol, ether, glycerine, turpentine, chloroform, and oils.

Nearly all our patients took their medicine in their own homes. Some undoubtedly failed to take it properly but generally they obeyed to the letter, the directions given. There were exceedingly few instances when the medicine was carried home and not taken at all. This we know from subsequent examinations of their feces and from general results of treatment. In this respect, we were agreeably surprised as we had been warned that our plans would be frustrated by the throwing away of the medicine. Those who constantly attended the clinic until cured, or until we left, often dreaded the administration of thymol on account of its accompanying purge, and sometimes from the dizziness and burning of the stomach produced. This is undoubtedly one of the various reasons why 507 of the Utuado cases failed to repeat their visits until cured, apart from the long distances to be covered over mountain trails, and the time lost from their daily occupations. Many ceased to return because they felt well after several doses. In general however, they will take anything that will rid them of their anemia, no matter at what sacrifice, no matter what the distance to be traversed. We have frequently seen them come from barrios where they had been obliged to start out for the hospital at midnight to reach there in time for examination and treatment, and many times it happened, where the crowd was too large to be handled in the morning hours, that two hundred persons have patiently waited from daybreak to late afternoon before receiving attention.

It may be asked, why was thymol preferred to other drugs said to be less dangerous? We have not shared the opinion of many as to the danger of administering thymol under a certain amount of precaution. The experiences of two of us in some hundreds of cases in Ponce demonstrated that its danger was greatly exaggerated and generally resulted from a solution in alcohol or oil. We came to know that thymol was an exceedingly inoffensive drug, as a result of our further acquaintance with it, for we have had no death that we can attribute to it unless it was the indirect cause of death in cases 18, 25, and 76 (Appendix, "Deaths") by acting unfavorably in a chronic enterocolitis. This tendency to irritate the mucous membrane is the only serious objection we have found with it, although it is perfectly well known that when absorbed, it has produced death. Our practical observation is that it is not absorbed to any great extent. Patients frequently volunteered the information that they had no effect from the purge and some remained even two and three days before a movement of the bowels resulted. Absolutely no symptoms of intoxication were seen in such persons, and now and then, they failed to show ova thereafter in the stools. In spite of solemn warnings given each and every one, at times they confessed to having taken "a swallow" of rum on feeling dizzy from the drug, yet no cases of poisoning occurred, although we had one with quite severe symptoms of collapse. It was sometimes given to pregnant women to save life. Of the eleven cases of pregnancy in which it was so administered, one was probably in the second month; one in the third; six in the fifth; three in the sixth. Two women in the 5th month aborted, but one did so six days after thymol was given, and her condition was so serious from uncinariasis, and the time so long after its administration, that it is not believed that she aborted as a result of the drug. In view, however, of the other abortion, possibly due to thymol, it should not be used unless it is seen that more risk is contracted by witholding than by giving it. Several women were refused treatment on this account. On several occasions nursing mothers were given thymol without bad effect to either mother or child, and without serious diminution in the secretion of milk. One case, in particular, is worthy of remark.

The woman was ghastly pale and struggling to nurse a puny baby a month old, with a daily decreasing secretion of milk. The child was crying with hunger and was given a little modified milk the day on which the mother was given a full dose of thymol. It was placed at breast on the night of the same day. After a series of such doses of thymol, both mother and baby became fat, of good color, and perfectly well. The effect on the milk was remarkably prompt, causing it to become very abundant.

One patient repeatedly vomited thymol when given with salts but held it down on changing the purge to podophyllin. In several instances, the thymol was taken in water without effecting emesis, according to the patients' statements. Manson states that at times thymol gives rise to a very unpleasant form of intoxication with vertigo, excitement, etc, and the urine may become dark as in carbolic acid poisoning, reporting Thornhill's case of fatal collapse due to administering liquor at the time of the second dose of thymol. Scheube adds to Manson's list, fall of temperature, retardation of the pulse and respiration, burning in the stomach and esophagus, and, finally, delirium and collapse. A tendency to vomit is seen at times, which may bring the drug in contact with the laryngeal mucous membrane and cause strangling. Boycott and Haldane, who used, in the Cornwall endemic, three successive doses of thymol, in capsule or emulsion, at intervals of two hours, state, in regard to the effects of thymol: "no unpleasant effects were observed. Patients were all treated at home so results could not be so well observed as at the hospital."

The same remark could be made of the work here although some did have dizziness, burning of the stomach, and a temporary increase in debility. The majority, however, had no symptoms from the drug. Excitement, burning in the urethra, and olive green or smoky urine were not observed. Nevertheless, as much care as possible was exercised and very ill patients were admitted to hospital and given preparatory treatment. Had it not been for this, our experiences in the use of this drug might have been much less fortunate. Unfavorable to the administration of thymol are; great debility, very old age, pregnancy, advanced cardiac or other organic disease, a tendency to vomit, anasarca, chronic diarrheas, and dysentery. Sandwith says: "Warned by the death of at least one of my patients I have always administered to feeble men 25 grammes of brandy with each 2 grammes of thymol". We are not in accord with this, as we believe that whiskey or brandy hypodermically, or nitroglycerin, strychnine, and digitalin are preferable for reasons stated above, though we feel sure that many of our patients neglected to observe our warning in regard to rum with thymol. In fact, our principle has been to stimulate and support all very advanced cases before the exhibition of thymol. The effect of a full dose on edematous persons is generally marked. Usually the next day, the edema is very much increased and may prove fatal from edema of the brain or lungs, not to speak of the dangerous increase of an already extreme ascites.

We have referred to the tendency to aggravate a case of dysentery or diarrhea. A most important detail in the treatment is the purge. It is believed that too powerful purges will kill a debilitated subject more quickly than thymol. Podophyllin is recommended by German writers, and we gave it fair trial. One of the objects of this drug and calomel is to sweep out the large amount of mucus in the upper bowel. The mucus, of course, covers the worm and acts as a protection to it against the anthelmintic. Podophypllin has no vermicidal effect per se as will be seen by reference to cases 54 and 55, Utuado series (Appendix) in which no worms were expelled by this drug alone. It was given to 342 persons in dose of 1 centigram, to 418 persons in dose of 2 centigrams, and to 1,697 persons in dose of 3 centigrams, making 2,457 persons of our 4,482 general cases. The adult dose was 3 centigrams which was always given with a reduced dose of sodium sulphate, the night before the thymol. We see no noteworthy advantage from its use in preference to other drugs.

The dose of thymol was graduated according to age but more especially according to the degree of debility, etc. of the patient. Thus it happened that many times a very weak subject took 1 or 2 grams the first visit, and the full dose thereafter, when his condition had been improved from the number of worms expelled. We do not agree with some English writers who state that large doses are always needed. They are preferable, but small doses, by expelling a goodly number of parasites, will often tide over a patient who might not resist a full dose. We have practically proven this by inspection of feces after small doses of thymol and observing the happy results obtained therefrom. One thing seems certain; as the total amount must reach the intestine within the space of two hours (for we are to kill parasites, not merely sicken them), the blow must fall heavily. Three decigrams every three or four hours is not a proper use of thymol. We have given .5 gram to little children under 5 years, with excellent results. In general, between 5 and 10 years, 1 gram is sufficient; between 10 and 15, 2 grams; between 15 and 20, 3 grams; between 20 and 60, 4 grams; above 60, 2 or 3 grams is generally all that we should give.

A tabulated chart showing the doses employed by us in 4,482 cases, arranged according to the age of the patient and the number of times a specific dose was given, is here seen. It should be remembered that the total number of persons is more than 4,482 for it often happened that one received different amounts at different times:

Table 22.—

ONE-HALF GRAM THYMOL.

Age.	Times.				Total persons.	Total times.
	1	2	3	4		
Under 5......	20	3	2	1	26	36

ONE GRAM THYMOL.

Age.	Times.								Total persons.	Total times.
	1	2	3	4	5	6	7	8		
Under 5..	4	2	1	2					9	19
5 to 9...	83	109	70	40	15	8	6	1	332	844
10 to 14...	69	31	31	19	7				157	335
15 to 59...	4	1							5	6
Total......	160	143	102	61	22	8	6	1	503	1,204

TWO GRAMS THYMOL.

Age.	Times.												Total persons.	Total times.
	1	2	3	4	5	6	7	8	9	10	11	12		
5 to 9........	33	36	27	9	4	3		3					115	284
10 to 14........	132	216	139	69	31	11	6	3					607	1,544
over 14........	40	16	8	9		1							74	138
Total.........	205	268	174	87	35	15	6	6					796	1,966

THREE GRAMS THYMOL.

Age.	Times.												Total persons.	Total times.
	1	2	3	4	5	6	7	8	9	10	11	12		
Under 10......	2												2	2
10 to 14......	75	84	42	20	13	6	3			1			244	581
15 to 59......	203	171	107	49	16	8	5	1	1				561	1,242
over 60......	14	19	10	8		1							52	120
Total..........	294	274	159	77	29	15	8	1	1	1			859	1,945

FOUR GRAMS THYMOL.

Age.	Times.												Total persons.	Total times.
	1	2	3	4	5	6	7	8	9	10	11	12		
Under 10......	1												1	1
10 to 14......	7	6	3										16	28
15 to 19......	69	113	77	48	18	7	4	1				1	338	898
20 to 49......	391	560	479	344	135	65	21	16	1				2,012	5,673
50 to 59......	73	53	39	21	12	3	2	1	1				205	489
over 60......	11	7	4	4	2		1			1			30	80
age not given..	2	1	2										5	10
Total.........	554	740	604	417	167	75	28	18	2	1		1	2,607	7,179

Nothing was found to indicate that the uncinaria americana was any easier to expel than the uncinaria duodenalis. It is true that we found two cases in San Juan which were due to infection by the latter parasite, and from the small size of some ova seen in Utuado, it is probable that others existed among our many patients, but we had no time nor opportunity to examine carefully any great number of the worms expelled. We did identify all we examined as belonging to the American species. Of 185 of Sandwith's cases, 95+% were cured in 5 or less doses, about the same result as we have secured.

There is no complete record of the number of doses given in Bayamon but we have calculated that about 2,000 doses were given.

The following tables show the number of times thymol was administered in 4,482 cases, general series, Utuado. Table 23, "A" details the number of times it was used; "B" the number of times it was needed to expel all uncinariæ; "C" the number of times it was given without effecting dislodgment of all uncinariæ.

Table 23.—

Number of doses.	"A"		"B"		"C"	
	Persons.	Times.	Persons.	Times.	Persons.	Times.
1	935	935	1,518	1,518	353	353
2	1,334	2,668	1,166	2,332	190	380
3	1,011	3,033	518	1,554	133	399
4	667	2,668	247	988	88	352
5	288	1,440	104	520	44	220
6	143	858	47	282	22	132
7	57	399	19	133	7	49
8	29	232	6	48	5	40
9	6	54	3	27	2	18
10	2	20	1	10	0	0
11	1	11	1	11	0	0
12	1	12	0	0	0	0
Thymol not given	8	0	0	0	0	0
Total	4,482	12,330	3,630	7,423	844	1,943

Following is a table showing the days needful to cure, arranged in groups of ten, and the number of persons classified according to the severity of the disease.

Table 24.—

Days.	Slight.	Moderate.	Marked.	Total.
1 to 9	367	2	0	369
10 to 19	428	217	2	647
20 to 29	168	239	54	461
30 to 39	52	110	75	237
40 to 49	28	60	88	176
50 to 59	12	41	68	121
60 to 69	10	23	34	67
70 to 79	3	21	25	49
80 to 89	1	3	16	20
90 to 99	2	0	2	4
Total	1,071	716	364	2,151

As to the number of days necessary to cure, it is needful to classify our cases according to degree of severity of the disease. In general, the time to cure depends upon the latter factor. Leichtenstern and German writers of latter date believe that the recently infected are the most difficult to cure from the small size of the worm and the readiness with which it is covered by mucus and folds of mucous membrane. We hardly believe that such a generality obtains. Old infections were to us very difficult to eradicate but we quite agree that very early infections are still more so. We know of many cases where thymol given previous to maturity of worms, failed to expel them. This may be due to encystation of the larvæ in the submucosa.

It was discovered late in our work that, whether from suspended ovulation, the result of sickening of the worm, or from whatever cause, ova disappeared from the feces to appear again in two or three weeks, or even longer. In some cases this was certainly due to subsequent infections. In view of these facts, we came to give thymol, even in absence of ova, when there was persistently low hemoglobin and continuance of symptoms. Many cases of failure to cure are thus due to a suspension of anthelmintic treatment in absence of ova from the stools, for the resumption of it caused the hemoglobin to rise with extraordinary rapidity. From this it may be deduced that about 10% of our cases might have reached a higher hemoglobin percentage. With this end in view 3,964 doses of thymol were administered after all ova had disappeared.

With the exceptions noted, thymol was given once a week as long as ova remained in the feces; 97.8+% of those who expelled all their uncinariæ received thymol five times or less; 41.8+% expelled all in one dose; 32.1+% in two doses; 14.2+% in three doses; 6.8+% in four doses; and 2.8% in five doses. Of 4,474 cases (excluding special cases) which received thymol, 81.1+% expelled all uncinariæ, but, subtracting 507 who never returned or ceased to return after two or more doses, this percentage rises to 91.5+.

This is to say that 68.6+% were cured in less than thirty days but, about two-thirds of these were light cases; 93.4+% of the moderate cases averaged two months to cure but 68.4+% of these only one month; 15+% of the marked cases required less than thirty days; 63+% from 30 to 59 days, and 21+% from 60 to 100 days.

We do not believe it necessary nor justifiable to administer more than four grams of thymol at a time nor to repeat this oftener than once a week, on account of the tendency of thymol in some persons to irritate the mucous membrane of the bowel.

Manson advises the placing of the patient on liquid diet for a day or two, an unnecessary (and here impracticable) measure, in our opinion, especially in underfed and weak outpatients. He gives "three or four ten to thirty-grain doses of well triturated thymol * * * at intervals of an hour." Mosler and Peiper administer 2 to 10 grams of thymol distributed in 3 to 6 doses throughout the day. They state that a little brandy, diluted, may be given thereafter.

Lutz's method is: After a light meal at 11 A. M., one-half gram of calomel and two grams of senna are given divided into four doses one hour apart and, following this, nutritious and easily digested food. On the next morning, two grams of thymol are exhibited, once, twice, or three times, at two hour intervals, preceded by a little coffee or broth. Following this, a bland purge if needful. It is of note that he recommends podophyllin, alone, or combined with jalap and belladonna, as a preliminary purge.

Scheube advises 4 to 8 grams of thymol in capsules or wafers. He distributes this dose into four parts, one to be taken every hour and a half, mentioning the fact that castor oil is a dangerous purge to follow thymol. This author waits twelve hours before administering the second purge which seems too long a time.

Leichtenstern gives two or three doses of two grams each at two hour intervals for several days until 20 grams are taken but prefers the use of male fern.

Giles gives thymol in three doses of 25 grains each, morning, noon, and night. The thymol is kept in a stock solution, 1 to 4 of alcohol, and the dose poured into a couple of ounces of water. He does not consider the previous purge absolutely necessary. This is a method which does not commend itself to us for many reasons.

Male fern. The official "oleoresina aspidii" (U. S.) is a violent poison in overdose, according to H. C. Wood (Therapeutics, Its Principles and Practice, 11th Edition, 1900), "producing excessive vomiting and purging, with general weakness, tremors, and cramps in the extremities, increased reflexes, amaurosis and finally, in some cases, violent tetanic convulsions, with opisthotonos, stupor deepening into coma, and collapse. Icterus is sometimes apparent * * * 6 drachms (22.2 grams) has several times proved fatal in the adult. Disturbances of the special senses is a not infrequent symptom in aspidium poisoning * * * more commonly amblyopia or complete amaurosis occurs. One or both eyes may be affected, and total blindness, with gray atrophy, may remain as a permanent condition". According to Quirll, the fatal result is partly due to the violent irritation of the gastro-intestinal tract and is partly the result of an influence upon the nervous system.

These symptoms are rarely observed. It is a remedy of great antiquity as one of the best anthelmintics known for tape worm and, lately, found to be very efficacious in uncinariasis; it is almost exclusively used in the continent of Europe, preferred because it was thought less dangerous and more effective than thymol. It is a very frequently adulterated drug, is variable in strength, much more costly than thymol, and liable to deteriorate, especially in this climate. We cannot believe it less dangerous than thymol and it is certainly as disagreeable to take if not more so, from our short experience with it. Bruns records four cases of blindness due to male fern but the number of doses given was large and usually no bad symptoms resulted. Of 21,612 cases treated in Westphalia, he reports 1.5% as failing to expel all parasites. Only 15 to 30% needed a second dose but he adds that ova appeared in quite a number, four weeks later. He complains of the variability in the potency of the drug. Tenholt reports that 4.2% of his cases needed more than three doses to effect a cure.

Lambinet gives 30 centigrams of jalap and calomel the night before and, on the following day, extract. filic. mas. 4., chloroformi 3., ol. ricini 40. This is known as "Duhourgan's tænifuge français," and is given in two doses with an hour's interval, and repeated the next day.

Töth says that Goldmann at Brennberg used 8 to 16 grams of filix mas, preceded by calomel. One-half of this is split up into five minute doses and the other half is given every ten minutes until all is taken, provided no bad effects ensue. Finally, jalap and calomel are exhibited. A few days afterward, 10 grams of purified oil of turpentine is given to complete the effect.

Töth's own treatment is 3 to 5 grams of filix mas with a glass of liqueur on each day during four or five days. He treated 300 cases in this way but noted that in 2 to 3%, icterus and intestinal catarrh resulted.

Dieminger did not consider the preliminary purge needful. He had no cases of collapse but did note icterus, gastritis, and gastro-enteritis in his cases so treated.

Italian observers have given 20 to 40 grams of the ethereal extract of male fern without untoward effects (Mosler and Peiper) but Scheube states that the Italian plant must be weaker than the German.

Leichtenstern says that 10 grams should not be exceeded, and Scheube calls attention to the danger of absorption when castor oil is used.

We preceded the administration of filix mas by .13 of calomel and .03 of podophyllin. The following day, 8 grams of the ethereal extract was exhibited and, at noon, a small dose of salts, if needed. In some cases where parasites were resistant to thymol, this gave good results, and in others, it did not. It seems to cause more dizziness and nausea and patients generally complained that they felt sicker and weaker after it than after thymol. These effects were certainly corroborated by their appearance. Undoubtedly both drugs are very efficacious, and a choice between them will always depend upon the physician's personal preference. It is evident, however, to us, that the extract of male fern is inferior to thymol here in Porto Rico for reasons given, and we further consider that its use should be restricted to those cases in which thymol fails to have a satisfactory effect. A change from thymol to male fern, or vice versa, seems at times very effective.

Beta-naphthol. This is certainly a valuable drug in uncinariasis and bids fair to eclipse the other two. We have expelled over a thousand uncinariæ by a single dose and have obtained several cures from its use but we have not had extended experience with it owing to the fact that we had concluded our field work when Bentley's important article fell into our hands. He states (Indian Medical Gazette, Calcutta, April, 1904, vol. 29, No. 4.) that he abandoned thymol two years ago to use beta-naphthol and has used it in several thousand cases with excellent results. It is administered just as is thymol save that two grams are employed instead of four. He adds: "By this treatment I have been able to expel in a number of cases from 500 to 1,000 worms," and calls attention to the price of this drug which is one-tenth that of thymol. It appears that dizziness does occur from its use but we have found it otherwise ideal in as far as a vermifuge may be.

This discovery of Bentley marks one of the most important eras in the therapeutics of uncinariasis, and beta-naphthol should be tried in preference to thymol until found less efficient.

Other drugs. The following drugs have been mentioned by various writers. Many of them have not stood the test of time:

Mosler and Peiper and others refer to the administration of the juice of ficus dolaria in 3 to 6 teaspoonful doses.

Powell recommends powdered areca nut but Ozzard states that it has proved "an absolute failure" in his hands.

Bentley expresses his view as to the value of well-known drugs, in order of efficacy, as follows: 1 Beta-naphthol; 2 thymol; 3 areca nut; 4 extract of filix mas.

A new preparation which seems to promise well, has been successfully tried at the Cockerill Hospital, Seraing. It is known as "Jorissen's preparation"; i. e., terpine .5 grams, levigated sulphur 2 grams, condurango powder, 1 gram. Its cost is great, 8 shillings per dose.

Goldmann advises an infusion of the bark of acacia anthelmintica but as it comes only from Abyssinia, it is extremely difficult to obtain as yet.

Braddon, of Straits Settlements, recommended oil of peppermint; Schokmann, of Ceylon, 30 drops of kerosene twice daily with mucilage; Macdonald refers to guaiacol carbonate as probably effective; J. E. Poole, of Maramaibo, Dutch Guiana (Med. News, New York, March 2, 1901) counsels thymotal, a carbonate of thymol.

RESULTS OF TREATMENT.

The following is a classification of the results obtained in Bayamon.

Table 25.—

Cured	52	persons.
Practically cured	91	"
Improved	228	"
Unimproved	52	"
Result not recorded	522	"
Died	2	"
Total	947	

In Utuado, 4,482 persons composed a general series in which only cardinal points were noted. The following table gives the results according to the clinical type:

Table 26.—

Result.	Slight.	Moderate.	Marked.	Total.
Cured	1,071	716	364	2,151
Practically cured	13	51	209	273
Improved	61	170	1,264	1,495
Unimproved	1	8	25	34
Died	2	2	18	22
Never returned	35	55	134	224
Ceased to return	38	59	186	283
Total	1,221	1,061	2,200	4,482

From the 61 special cases, we have extracted the following resumé:

Table 27.—

Results.	Slight.	Moderate.	Marked.	Total.
Cured	1	1	40	42
Practically cured	0	1	12	13
Improved	0	0	3	3
Died	0	0	3	3
Total	1	2	58	61

Grand total of 5,490 cases:

Table 28.—

Cured	2,244
Practically cured	377
Improved	1,727
Result not recorded	522
Never returned	224
Ceased to return	283
Unimproved	86
Died	27
	5,490

One death has been excluded from this list because it does not belong to the Commission's field work. "Cured" should be taken to mean disappearance of all symptoms of the disease, with absence of ova from the stools, and a hemoglobin percentage of 85 (v. Fleischl apparatus). This class forms 40.8+% of the whole number. The percentage of cured in Utuado alone was 48+. "Practically cured" has the same meaning with the exception that the percentage of hemoglobin lies between 70 and 85. These form 6.8+% of the total. Added to the number of cured, the percentage would be 47.6+ of the entire number, and 54+ for the Utuado cases. "Improved" form 31.4+% of the total; in Utuado they formed 32+% of those cases. Thus the percentage of cured, practically cured, and improved to the whole number is 79. In Utuado, these form 87+% of all cases treated there. "Unimproved" form 1.5 + % of the total, and the "Deaths" .5—%.

Those who never returned after the first dose or who ceased to return after attending a short while, form 18+% of the total. In such persons we had no opportunity to complete the treatment.

The majority of cases were from two weeks to two months under treatment, excluding the last named class. The difference between the results obtained in Bayamon and those of the Utuado series lies in the fact that few of the former exceeded three weeks of treatment. In other words, all but 53 of these cases were incomplete, for many more would have been cured in three weeks additional treatment. Many here noted as "improved" and "practically cured" are now well, discounting those who have become reinfected, and taking into account the 522 of whom there is no record. Thus the difference lies chiefly in the length of our stay at each place; in Bayamon but seven weeks against fourteen in Utuado.

We have accurate data concerning the number of visits paid us by our patients, only in the Utuado cases:

Table 29.—

One visit	331 persons	331 times.
Two visits	664 “	1,328 “
Three “	955 “	2,865 “
Four “	861 “	3,444 “
Five “	667 “	3,335 “
Six “	446 “	2,676 “
Seven “	265 “	1,855 “
Eight “	166 “	1,328 “
Nine “	84 “	756 “
Ten “	29 “	290 “
Eleven “	11 “	121 “
Twelve “	1 “	12 “
Thirteen “	0 “	0 “
Fourteen “	2 “	28 “
Total	4,482 persons	18,369 times.

The percentages of hemoglobin of the cured, practically cured, and 578 of the improved in the Utuado general series may be detailed as follows (special cases are excluded as they appear elsewhere):

Table 30.—Cured.

Between 85 and 89	726 persons.
“ 90 “ 94	411 “
“ 95 “ 99	258 “
“ 100 “ 109	426 “
Over 110	330 “
Total	2,151 persons.

Table 31.—Practically cured.

53% *	1 person.	77%	7 persons.
70%	57 persons.	78%	17 “
71%	8 “	79%	6 “
72%	20 “	80%	28 “
73%	21 “	81%	6 “
74%	13 “	82%	10 “
75%	41 “	83%	3 “
76%	17 “	Not given	18 “
		Total	273 persons.

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* This patient, though only possessing 53% Hb., had good color and said he felt completely cured.

Table 32.—Improved (578 cases).

Between 20 and 29%	3	persons.
" 30 " 39%	38	"
" 40 " 44%	36	"
" 45 " 49%	55	"
" 50 " 54%	92	"
" 55 " 59%	106	"
" 60 " 64%	141	"
" 65 " 69%	107	"
Total	578	persons.

Classification of the other cases in this series according to the clinical type is as follows:

Table 33.—Never returned.

Slight cases	35	persons.
Moderate "	55	"
Marked "	134	"
Total	224	persons.

Table 34.—Ceased to return.

Slight cases	38	persons.
Moderate "	59	"
Marked "	186	"
Total	283	persons.

Table 35.—Died.

Slight cases	2	persons.
Moderate "	2	"
Marked "	18	"
Total	22	persons.

The unimproved and 917 of the improved are not classified.

Although the actual results are here chronicled, no accurate conception can be formed of the effect of *expulsion of all uncinariæ* upon the patient sick of uncinariasis, unless the progress of convalescence be followed in person. Children in the extreme grades of the disease, without life enough to take interest in things that belong to childhood, often rapidly gain in color and spirits to such an extent as to change them entirely in physique and character. This is of course, by no means confined to children. A curious effect of the first dose of thymol is frequently seen in that, although the anemia usually remains as profound as ever, the patient looks and feels better. This is the chief reason why our large clinic was so regular in its attendance notwithstanding the inconvenience entailed.

In older persons, who for a long time have been anemic and debilitated by many other concomitant conditions, a slow convalescence is frequently seen, due to a loss of power of regeneration of the blood but as frequently we see an apparently hopeless case, turned away after six or seven doses of an anthelmintic, in the belief that a return to health is impossible, appear six months later, healthy and with normal blood. There is a very decided tendency to slow recovery when food is especially poor and a small percentage of our cases who were not cured fall in this group. Another element to be considered is the presence of even a few worms, so few perhaps that ova in the feces are not found.

A most notable case of Dr. Francisco Goenaga, Superintendent of the Island Insane Asylum, the details of which he has kindly furnished us, should receive special attention :

C. P.; female; accused of murder; placed in the insane asylum, Nov. 19, 1902. She was then suffering from mania with hallucinations and from the most profound grade of anemia. "Little by little, ferruginous, arsenical, and other tonics, aided by needle baths, exercise in the open air, and proper food bettered her mental condition a good deal. But she remained a victim of anemia until, aided by my distinguished colleague, Doctor Don Pedro del Valle Atiles, the uncinaria duodenalis was discovered by microscopical examination. I proceeded to their expulsion. In a surprisingly short period (3 months), a complete regeneration of her blood was obtained which effected at the same time a cure of her mental condition. The 27th of June of this year, it was possible to hold the trial which had heretefore been in suspension. She was declared innocent by the District Court and returned to her home in Rio Grande."

While not pertaining to results obtained by the Commission, we would like to call attention to some of our confréres in Porto Rico who are actively working on this subject, viz: Lopez Gaztambide, of Arecibo; Gonzalez Martinez, and Malaret, of Mayagüez; Aguerrevere, of Ponce; Gatell, of Yauco; Cesteros, of Guayama; Pedro del Valle and Ricardo Hernandez, of San Juan; and possibly others of whom we are not informed. It is with much regret that lack of space prohibits including in full the opinions so courteously expressed to us, but we can only mention here a report sent us by Dr. Agustin Stahl, who may be considered the dean of the medical fraternity of Porto Rico, not only for his years but for his life spent in laborious toil to advance Science. He has been, from its inception, a constant student and hard practical worker in subject now before us.

In Bayamon after our departure, he alone took up the question, and the result is a most interesting report which he will publish at some future time. In six months he has had four hundred cases. The following is a brief resumé of his conclusions:

He had more males than females. The drinking of well water and the custom of using no shoes are mentioned as factors in causing infection. The great majority of his cases were between 20 and 30 years of age and he considers the negro race as being possessed of a decided immunity to the hemolytic toxin. He states that his belief, in regard to those who are irregular in their attendance or who fail to return after one or more doses of an anthelmintic, is that they come long distances not easily covered in their sick condition, or they get well or relatively well and consider return unnecessary. He considered all cured who reach 75% in their hemoglobin. Light infections frequently do not produce anemia in persons whose surroundings are good. Heavy infections produce anemia no matter how good the food but a slow convalescence may be expected from poor food or due to this condition plus an exhaustion of blood-making organs. He affirms that uncinaria, not mere poverty alone, is the determining cause of the anemia in Porto Rico. Many, though, who seem to have no anemia are often found to possess a subnormal hemoglobin. He considers from 20 to 150 days as the usual limits of time necessary for a cure, mentioning the fact that the administration of thymol after all ova have disappeared, often results in a rise in hemoglobin.

He ends by an earnest appeal to continue the work, individually and as a public measure, stating that it is "sufficiently proved that dietetic regimen, improved hygiene, iron tonics, quinine, etc., are inefficacious in combatting the 'anemia' here."

One of the most surprising results appeared when a division of the cured cases was made into those who took iron and those who did not, viz;

Table 36.—Iron in relation to days to cure (groups of 10), and grade.

Days.	Slight.	Moderate.	Marked.	Total.
1– 9	0	0	0	0
10–19	15	8	2	25
20–29	74	106	24	204
30–39	30	83	56	169
40–49	26	50	73	149
50–59	11	35	50	96
60–69	10	22	33	65
70–79	3	20	24	47
80–89	1	2	16	19
90–99	2	0	2	4
Total	172	326	280	778

Table 37.—No iron in relation to days to cure (groups of 10), and grade.

Days.	Slight.	Moderate.	Marked.	Total.
1– 9	367	2	0	369
10–19	413	209	0	622
20–29	94	133	30	257
30–39	22	27	19	68
40–49	2	10	15	27
50–59	1	6	18	25
60–69	0	1	1	2
70–79	0	1	1	2
80–89	0	1	0	1
90–99	0	0	0	0
Total	899	390	84	1,373

These results should be considered in the light of the following explanation. Iron was not given to patients at their first visits, except in very severe cases, and, if they progressed well, it was oftentimes never given. When progress was slow, iron was given in the form of Blaud's, Vallet's, or Blancard's pills, 3 to 6 daily.

A generous lot of Peptomangan (Gude), kindly supplied by M. J. Breitenbach Co., of New York, was used chiefly in the special cases.

It will be noticed that slight cases readily recover without iron, and here the difference in the tables is more marked while there is less difference among the marked cases in proportion to their number. In other words, the more resistant cases of all grades received iron but even then, did not generally recover as rapidly as those less rebellious without, for while ferruginous preparations seem to act readily in some instances, still, in the majority, its effect was not very marked. The rapidity of cure is due, apparently, more to the personal equation of the patient and the rapidity with which the parasites are expelled, than to the amount of reconstructive treatment. Thus it is quite difficult to accurately judge the comparative value of different iron preparations, yet it was noticed, even by some patients, that Blaud's pills gave more rapid results.

In a series of 22 cases, selected to represent approximately the various grades of the disease and all ages of patients, no reconstructive treatment of any kind was given, so as to particularly observe the effect of expulsion of the uncinariæ alone. The results were; cured, 7, (31.81+%); practically cured, 2 (9.09+%); improved, 10 (45.45+%); unimproved, 3 (13.63+%). Their average of hemoglobin percentage, on entrance was 44.59+; final average 64.67+. These percentages compare very favorably with the general results.

It is the testimony of many patients and physicians here that iron without expulsion of uncinariæ, is of little benefit, and oftentimes of positive harm, inciting diarrhea. This may depend somewhat upon the form given.

Iron, therefore, while generally advantageous, especially in severe cases, has a much less important rôle in the therapeutics of this disease than anthelmintics.

ADDENDUM.

We have treated of the merits of podophyllin from the standpoint of its usefulness as a purge. As an anthelmintic, it is given in Germany in much larger doses than those used by us, and for several days consecutively, but we were unable to secure the details of the treatment there employed until after this report was in print, although references in our American medical press implied very large doses.

As a matter of fact we did not consider enormous doses in weak subjects (such as we had) very safe, certainly not as much so as other and better drugs.

We say that we gave podophyllin a fair trial but find that this dose was insufficient, according to the German method of administering this drug in this disease, although 3 centigrams would seem to be sufficient for the expulsion of at least some worms, were the drug as efficient as the standard anthelmintics.

INFORME

DE LA

COMISIÓN NOMBRADA PARA EL ESTUDIO Y TRATAMIENTO

DE LA

"ANEMIA" EN PUERTO RICO

De acuerdo con una Ley de la Asamblea Legislativa

Aprobada en Febrero 16 de 1904.

Respetuosamente presentado al

HONORABLE BEEKMAN WINTHROP

Gobernador de Puerto Rico.

DICIEMBRE 1º, 1904.

BUREAU OF PRINTING AND SUPPLIES,
SAN JUAN, P. R.

CARTA DE TRASMISION.

San Juan de Puerto Rico,
1° de Diciembre de 1904.

ERRATAS.

Página 11, párrafo 2, línea 11: donde dice "380" debe ser "323".
Página 12, párrafo 2, línea 8: donde dice "revelantes" debe ser "relevantes"
Página 20, párrafo 2, línea 1: donde dice "fallecimiento" debe ser "padecimiento"
Página 41, párrafo 7, línea 4: donde dice "donde se realiza" debe ser "donde la defecación se realiza"
Página 48, párrafo 3, línea 16: donde dice "y encuentra en el" debe ser "y encuentra en el pescado que ingiere'
Página 90, párrafo 4, línea 11: donde dice "diluidas" debe ser "no diluidas"

Honorable Beekman Winthrop,
Gobernador de Puerto Rico,
San Juan, Puerto Rico.

CARTA DE TRASMISION.

San Juan de Puerto Rico,
1° de Diciembre de 1904.

Señor:

Tenemos el honor de presentar á V. H. el informe de la Comisión nombrada por el Gobernador de Puerto Rico de acuerdo con la "Ley proveyendo medios para el estudio y supresión de la enfermedad conocida con el nombre de 'Anemia' en Porto Rico."

Limitaciones de tiempo y espacio nos han impedido emitirlo por igual en inglés y español; no obstante, hemos procurado llevar á cada parte, lo sustancial y de inmediato interés para los lectores de los idiomas respectivos.

Respetuosamente,

Bailey K. Ashford, M. D. (Univ. de Georgetown.)
Capitán Cirujano del Ejército de los Estados Unidos.

W. W. King, M. D. (Univ. de Louisville.)
Capitán Cirujano del Servicio de Sanidad y
Hospitales Marítimos de los Estados Unidos.

Pedro Gutierrez Igaravidez, M. D. (Univ. de Sevilla.)
Oficial de Sanidad de Bayamón y Director del Hospital Municipal.

Honorable Beekman Winthrop,
Gobernador de Puerto Rico,
San Juan, Puerto Rico.

LEY

Proveyendo medios para el estudio y supresión de la enfermedad conocida con el nombre de "Anemia" en Puerto Rico.

Decrétese por la Asamblea Legislativa de Porto Rico:

SECCIÓN 1.—El Gobernador queda por la presente autorizado para que adopte las medidas que á su juicio fuesen mas conducentes á fomentar el estudio y curación de la enfermedad conocida con el nombre de "anemia tropical" en Puerto Rico.

SECCIÓN 2.—Para llevar adelante la obra, construcción de hospitales ambulantes, empleados temporeros, compra de medicinas, instrumentos, materiales para el laboratorio y otros gastos imprevistos, por la presente se asigna la cantidad de cinco mil dollars, de cualquier dinero en el Tesoro que no se hubiese asignado para otras atenciones, la cual suma se desembolsará en la forma y para las atenciones que el Gobernador ordenare.

SECCIÓN 3.—Está Ley empezará á regir inmediatamente después de su aprobación.

MANSION EJECUTIVA,
Febrero 16 de 1904.

Aprobada:

Wm. H. Hunt,
Gobernador

HISTORIA DE LA UNCINARIASIS EN PUERTO RICO.

Organización de la Comisión.—Marcha de los trabajos.—Conclusiones.—Profilaxis.—Servicios prestados á la Comisión.—Inversión de fondos.

Los motivos que indujeron á la organización de la actual Comisión para el estudio de la anemia en Puerto Rico, están relacionados con un hecho, que marcó nuevo rumbo en la génesis de una enfermedad por largo tiempo sufrida en el pais. Este hecho tuvo lugar en Ponce, á raiz del huracan de 1899; cuando el entonces Gobernador de la isla, General Davis, dispuso que el Cirujano Militar Dr. Bailey K. Ashford, destacado en aquella población, estableciese un hospital provisional para recoger los enfermos que por exceso de número, no tenían cabida en los hospitales de la Ciudad. La orden fué cumplida y un hospital de campaña con 136 camas quedó instalado y empezó á funcionar. Bien pronto se observó, que las tres cuartas partes de los solicitantes eran individuos profundamente anémicos y se atribuyó desde luego ese estado, á una deficiente alimentación por algún tiempo sostenida, á influencia del medio ó al factor paludismo. Se les suministró el régimen alimenticio apropiado, se les instituyó la medicación oportuna esperándose, por lógica consecuencia, que estos enfermos alcanzaran completa curación. Pero lejos de eso, los anémicos no mejoraban. Ni alimentos ni medicamentos lograron levantar de su postración aquellos organismos. Algunos médicos emitieron su parecer de que se trataba de casos de *anemia perniciosa* y el exámen de la sangre practicado por el mismo Dr. Ashford, desvaneció esta creencia, pero le llevó á suponer, por la alta *eosinofilia* encontrada en muchos de ellos, que tal anemia obedecería acaso á parásitos intestinales y entre éstos, como más importante, al *anquilostoma duodenal.* Tal hipótesis le condujo á examinar las heces de sus enfermos y la sospecha tuvo realidad: bajo la lente del microscopio aparecieron los huevecillos del *anquilostoma.*

Esta fué (sin que nosotros hallamos podido encontrar otra anterior) la primera demostración del parásito en Puerto Rico; pues aunque R. Blanchard en 1888 (Traité de Zoologie Medicale) denuncia la presencia del helminto en las Islas occidentales y Brazil, incluye á Puerto Rico entre aquellas, por analogía de la enfermedad en todas padecida; pero no menciona la existencia del verme aquí.

La prueba anatomo-patológica registrada por Ashford, fué inmediatamente comunicada al Cirujano Jefe, Dr. John Van R. Hoff, Presidente de la Junta Superior de Sanidad en aquella fecha. Una monografía de la enfermedad, que el parásito ocasionaba, publicó aquel Centro; cuya monografía se distribuyó por la Isla, sin que recibiera la atención debida, ni modificara la creencia general de que la alimentación, el clima, las trasgresiones de la Higiene, eran responsables de la anemia que sufría el campesino puertorriqueño.

En 1902 y gracias á la cortesía del Dr. Luis Aguerrevere, Médico del Hospital Tricoche de Ponce, les fueron cedidas á los Dres. Ashford y King, dos salas para enfermos anémicos de ambos sexos, que hubieron de recibir la medicación antihelmíntica. Como resultado de sus investigaciones, un estudio de 100 casos tratados, se publicó en la Revista "American Medicine" en 5 y 12 de Agosto de 1903. Por esta época, se le enviaron algunos ejemplares del parásito encontrado al Dr. Ch. Wardell Stiles, Zoólogo del Servicio de Sanidad y Hospitales Marítimos de los E. U., quien comunicó, que dicho verme pertenecía á una variedad llamada por él *Uncinaria Americana*, distinta á la especie *Anquilostoma*, del viejo mundo. La enfermedad fué entonces designada con el nombre de *Uncinariasis*, prefiriéndolo al de *Anquilostomiasis*

El informe referido y los estudios subsiguientes, despertaron considerable interés, y el Dr. Ashford fué invitado á llevar su tesis á la sesión anual de la Asociación Médica de Puerto Rico, celebrada en Diciembre de 1903. Discutióse allí el tema, nombróse una comisión de tres de sus miembros para que lo estudiara y más tarde, en Abril del año actual, dicha Comisión informó de acuerdo con lo sustancial, aunque discrepando en la apreciación de algunos detalles.

Con anterioridad á esta última fecha, el Honorable Wm. Hunt, á la sazón Gobernador de la Isla, y el Honorable Régis H. Post, Auditor de Puerto Rico, habían fijado su atención en la enfermedad, reconociendo la importancia económica que para el país tenía, tanto que el Gobernador en su Mensaje anual á la Asamblea Legislativa, en Enero de 1904, llamó especialmente su atención hacia la necesidad de emprender una campaña contra la dolencia. Un proyecto de Ley presentado por el Hon. Mr. Post, aceptado por las Cámaras y aprobado por el Gobernador en Febrero 16 de 1904, puso á disposición de éste, la cantidad de $5,000 que habían de ser invertidos en el estudio y tratamiento de la enfermedad.

El Hon. Wm. Hunt nombró con este propósito una Comisión compuesta de los siguientes miembros: Dr. Bailey K. Ashford, Capitán Cirujano del Ejército de los E. U.; Dr. W. W. King, Capitán Cirujano del Servicio de Sanidad y Hospitales Marítimos de los E. U.; Dr. Pedro Gutierrez Igaravidez, Oficial de Sanidad de Bayamón y Director del

Hospital Municipal. Este último, además de sus deberes como miembro de la Comisión, actuó como depositario de fondos y pagador.

A solicitud del Gobernador, el Secretario de la Guerra y el Secretario del Tesoro, destacaron á los Drs. Ashford y King para tomar parte en el trabajo, percibiendo sus sueldos correspondientes de los Departamentos respectivos, sin que, por sus servicios, recibieran haber alguno del Gobierno Insular; pero en atención á que el Dr. Gutierrez debía abandonar temporalmente su destino, le fué asignada la suma de $150 mensuales.

El método que en el trabajo había de seguirse, fué dejado enteramente á voluntad de la Comisión y esta decidió que ninguna especial nominación de cargos era necesaria; pero que todos los asuntos habrían de discutirse á medida que se fueran presentando. Fué acuerdo también; que ningún miembro se dedicara á determinada labor, sino que todos por igual serían partícipes en la obra y sus detalles, á fin de que, las conclusiones, reflejaran la opinión de los tres comisionados. De ese modo, toda observación personal era confirmada por los otros dos.

Por disposición del Departamento de la Guerra, el Cirujano general del Ejército, en cable 7 de Marzo, autorizó al Gobierno Insular para utilizar el material de su propiedad, consistente en tiendas de campaña, catres, frisas, sábanas, en una palabra, todo el equipo de un hospital de campamento, menos los utensilios de cocina y comedor que fueron comprados por la Comisión. Cada miembro de la Comisión aportó su instrumental de laboratorio que, de otra suerte, habiendo tenido que adquirirlo esta se hubiera mermado de modo considerable la asignación que se le confiara. Apesar de ello, fué preciso desplegar la mayor economía en los gastos y, á trueque de echar sobre nosotros toda la ímproba labor, se evitó la concurrencia de los ayudantes técnicos necesarios. La Comisión comprendió que una delicada y árdua empresa se le encomendaba no sólo por lo limitado de los recursos, sino porque había de tratar con una clase social naturalmente desconfiada y recelosa de ser sujeto de experimentación.

Díjosenos que el campesino era muy ignorante para poder tomar los medicamentos en su casa, que no dormiría en las tiendas por temor á la humedad y al aire de la noche, que no seguiría el régimen que se le instituyera y que no vendría á nuestro dispensario con la regularidad que le exigiéramos. Ninguno de estos presagios se cumplió.

Con tacto, paciencia, y bondad ganamos pronto la confianza de nuestros pacientes despertando en ellos la fé. Y, para los que no lo conocían á fondo, apareció un pueblo dócil, respetuoso, obediente, profundamente agradecido y mucho más inteligente que lo que la creencia general lo estima.

Las razones que hubimos de tener en cuenta, para tomar á Bayamón como primer punto de nuestras experiencias fueron ; la proximidad á San Juan, base para el suministro de los utensilios necesarios, las facilidades de transportación y, sobre todo, el deseo de ofrecer á nuestros compañeros de la Capital, oportunidad de observar nuestro trabajo.

El sitio elegido fué una explanada contígua al Hospital Municipal, cuyo terreno cedió gratuitamente el Ayuntamiento. Diez tiendas de campaña fueron trasportadas; á cada una se le hizo un piso portátil, de madera, según la idea que nos sugiriera el Sr. Scott Truxtun, y ocho de ellas se destinaron para dormitorios, con seis catres plegadizos por tienda, dejando las otras dos una para comedor, y otra para la Administración. Aprovechando la pequeña elevación del terreno, allí donde la faja de tierra se encontraba con un río poco caudaloso, ocho tiendas colocadas en hilera quedaron instaladas y á su frente, en dirección al Hospital Municipal, la tienda comedor; y entre ésta y aquél, la dedicada á la Administración.

En un ángulo del campo cedido, se levantó una caseta de madera y yaguas con dos divisiones, para letrinas, y dos ó mas zambullos, convenientemente colocados, respondieron á las necesidades del servicio; habiéndose dispuesto, que todas las noches se vaciara su contenido en un sitio distante y en hoyo préviamente hecho, que en el acto se cubría con tierra. Estos recipientes, una vez lavados, se les dejaba un poco de cal en su interior y se colocaban de nuevo en la caseta donde, además, había un cajón del carbonato para echarles con frecuencia durante el día. Las letrinas fueron quemadas, al cambiar de sitio el campamento.

Las oficinas de la Comisión, dispensario, laboratorio, etc., se instalaron en el Hospital Municipal, y en la cocina del mismo se preparaban las comidas para los enfermos y empleados. El número de estos últimos, y su renumeración mensual fué el siguiente:

1 practicante	$50.00	
1 ama de llaves	20.00	
1 cocinera	4.00	
2 enfermeros	6.00	cada uno
2 mozos de servicio	4.00	" "
1 " para limpieza de letrinas	12.00	

A poco de quedar instalado el campamento, fué visitado por el Hon. Wm. Hunt, Gobernador; Charles Hartzell, Secretario; y Régis H. Post, Auditor de Puerto Rico.

El reconocimiento y admisión de enfermos, dió principio el 6 de Marzo, en el referido Hospital Municipal, donde se habilitaron algunos departamentos para ello, hasta el 14 que funcionó ya el de campaña.

Desde el 6 de Marzo, al 30 de Abril, se recibieron y trataron sin interrupción todos los solicitantes. Durante ese tiempo, 951 casos de anemia fueron registrados; según consta en el capítulo correspondiente de este informe. Las personas que demandaban nuestros cuidados, se les invitaba á traer un poco de sus heces para hacer el exámen microscópico que, en 947, fué positivo para los huevecillos de uncinaria americana, única causa, obtenida por exclusión, de la anemia que sufrían. Algunos aquejaban otra enfermedad concomitante, como tuberculosis, lesión orgánica de corazón etc. Los 4 casos en que la anemia no apareció debida á la *uncinariasis* fueron: 1 de entero-colitis, con 40% de hemoglobina;* 1 de disentería, con tasa de hemoglobina desconocida; y 2, cuya causa no pudo precisarse, con 46% y 60%.

Determinada la presencia del parásito, cada paciente era enviado á una habitacion contígua, donde se procedía al exámen de su sangre por medio del hemoglobinómetro, y se anotaba el resultado en el libro correspondiente. Una historia clínica, completa, se dispuso para cada caso, pero pronto el aumento de enfermos en el consultorio hizo imposible este propósito, limitándonos solo á registrar la tasa de hemoglobina y alguno que otro dato esencial y culminante de la Anamnesia y Sintomatología. Aunque fué decidido trasladar á Utuado el campamento, se continuó admitiendo nuevos pacientes, á fin de proporcionarles el beneficio de la medicina; pero sin computar su hemoglobina, porque no habían de seguir bajo nuestra observación. A 380 de estos no se les practicó el examen cromométrico.

Los pacientes, hecho el diagnóstico, recibían una receta que el practicante se encargaba de despachar, instruyéndoles al mismo tiempo en el modo de tomar los medicamentos y haciéndoles repetir varias veces las instrucciones, hasta que se daban completa cuenta de la cosa. Ademas, les anunciaba la obligación de volver á la semana siguiente, para llevar nuevos medicamentos. La mayoría cumplió el encargo; lo que probaba la bondad del tratamiento, pues, á no haberse sentido mejor, no hubieran vuelto; cuando para ello habían de recorrer largas distancias y el mayor número á pié.

El Hospital fué usado solo por aquellos enfermos en grave estado recogidos, por los que no podían regresar á sus casas, ó por aquellos otros á quienes se les debía observar durante la administración de los medicamentos. Por regla general, permanecieron en las tiendas no más de tres ó cuatro días, dejando sitio para otros solicitantes.

La mayoría de los casos de Bayamón y Utuado, ni estuvieron en el Hospital, ni recibieron de la Comisión alimento alguno. El que se les

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Hemoglobina: Sustancia colorante de la sangre que en estado normal la hace aparecer roja y que hallándose disminuida en el curso de ciertas enfermedades, le da un color más ó menos pálido; siendo su apreciación, por aparatos graduados al efecto. el índice más seguro para estimar la "Anemia." La cifra normal de hemoglobina oscila entre 85 y 100%.

suministraba á los acogidos no tuvo, por otra parte, nada de especial. La ración alimenticia usual del labriego de este país, consistente en un rancho variado de carne, habichuelas, arroz, y verduras, fué indistintamente servida á unos y á otros sin que, á un régimen especial, se confiara el adelanto en la curación de los casos graves. Y, es prudente hacer notar aquí, cómo á un tipo de $ 0.12, á que alcanzó el importe de la ración suministrada, no puede disponerse ninguna especial dieta, y que esos mismos enfermos, para obtener su restablecimiento, hubieran recibido en cualquier hospital un régimen alimenticio más completo, más variado y por lo tanto, mas caro.

A instancias de los Alcaldes de Naranjito y Toa-Alta, fueron visitados estos pueblos en Marzo 19 y Abril 9 respectivamente. Considerable número de uncinariasicos se encontró, á los cuales se les invitó á venir á nuestro hospital en Bayamón. Tuvimos el propósito de establecer sub-estaciones en aquellos pueblos; pero ante la imposibilidad de visitarlas regularmente los miembros de la Comisión, desistimos del proyecto.

Durante nuestra permanencia en Bayamón, acaeció la muerte del Dr. Enrique Rodríguez Gonzalez, cooperador voluntario en nuestro trabajo, que llevó sus entusiasmos hasta el último instante en que una embozada lesión cardiaca le privó repentinamente de la vida. La pérdida de aquel compañero ilustrado y amante de su profesión, de aquel amigo leal y cariñoso y de aquel puertorriqueño de alma grande y generosa, impresionó profundamente á todos los que le conocieron y más á los que como nosotros, tuvimos ocasión de aquilatar sus revelantes cualidades.

Las operaciones en Bayamón se cerraron en Abril 30 como antes hemos dicho; pero el Dr. A. Stahl, que había trabajado con la Comisión, aceptó el encargo de continuar recibiendo los pacientes que dejábamos bajo tratamiento. Sus servicios terminaron el 15 de Junio y el resultado va incluido en las estadísticas de Bayamón. Después de esta fecha, continuó el Dr. Stahl sus investigaciones que ha recogido en un importante informe presentado á la Comisión, y al que dará publicidad su autor.

Desde el 1.º al 9 de Mayo, nos ocupamos en el traslado del Campamento á Utuado: uno de los distritos donde las estadísticas acusan mayor contingente de anémicos. Con alguna dificultad se hizo el trasporte; pero al fin el Hospital quedó instalado en Mayo 9. Antes, la Comisión había visitado aquella Ciudad y elegido sitio para el Campamento en una vega contigua á la población y separada de esta por el río Vivi. Las tiendas fueron colocadas formando un rectángulo: 4 en los lados más largos y una en los cortos; dejando una tienda para comedor y convirtiendo la que en Bayamón se usaba para Administración en otro dormitorio. De este modo, el número de camas aumentó de 48 á 54. El sistema de letrinas fué el mismo.

Como á 200 yardas del Campamento, una hermosa casa, cómoda y ventilada fué cedida en alquiler á la Comisión y en ella se instalaron las oficinas, el dispensario, laboratorio, etc., sirviendo además de vivienda á los empleados, de almacén y cocina. El personal en Utuado fué el siguiente:

1	practicante........................	$ 25	al	mes.
1	ama de llaves......................	20	"	"
1	cocinera...........................	4	"	"
1	enfermero..........................	8	"	"
1	enfermera..........................	4	"	"
1	mozo de servicio...................	4	"	"
1	" para limpieza de letrinas......	9	"	"

La experiencia adquirida en nuestro consultorio de Bayamón, nos sirvió para mejorar el sistema en el de Utuado. A cada paciente dimos una tarjeta con el número, nombre y residencia que correspondía á la anotación hecha en el libro de entrada, á donde llevábamos además, el resultado del exámen microscópico, la nota del medicamento prescrito, y algunas particularidades del caso. De este modo, al presentar su tarjeta el enfermo, era fácil encontrar su nombre en el libro, por el número correspondiente.

Suponiendo que el de solicitantes había de ser crecido, decidimos no hacer el exámen de la hemoglobina al ingreso del paciente, excepto en casos especiales, por la imposibilidad que habíamos de tener para ello y más tarde, la visita de 500 y 600 personas diariamente nos confirmó nuestros temores. La tasa de hemoglobina se obtuvo en los enfermos de Bayamon al ingreso, para apreciar el grado de su anemia. En Utuado estos pacientes eran del mismo tipo ó de grado más marcado. También se estimó la hemoglobina en los casos especiales citados en el Apéndice, donde se incluyen además algunos de los de Bayamón, de mayor interés para nuestro estudio. Estos casos especiales eran los más típicos de la enfermedad. A ellos se dedicó preferente atención á la hematología, apreciando semanalmente su hemoglobina, computando sus glóbulos rojos y blancos, y obteniendo el tanto por ciento de los diversos elementos celulares circulantes.

Por lo demás, el procedimiento seguido en Utuado fué el mismo que en Bayamón. Los enfermos llegaban en las primeras horas de la mañana, generalmente á pié, muchos habiendo salido de sus casas la noche anterior, otros invirtiendo varios dias en el trayecto, y todos con las huellas de la enfermedad en el rostro.

Solos ó en grupos venían de los barrios más distantes en diaria peregrinación á nuestras oficinas y, ya en el patio de la casa, ó bajo un cobertizo de paja contiguo donde se guarecían de la lluvia ó de los rigores del sol, pacientemente aguardaban hasta que se les llamaba. Luego, por pequeños pelotones subían á la casa; colocábaseles en hilera en el balcón y uno á uno, por turno riguroso, iban entrando para ser reconocidos.

Los casos graves eran trasportados en hamaca y de estos, doce se recibieron en un solo dia; habiendo llegado uno en tal estado que falleció á las pocas horas de estar en el campamento.

En los primeros días nos fué posible cerrar la clínica á las 12 ó á la 1 de la tarde, pero después necesitamos atenderla hasta las 4 ó las 5. Las horas libres que nos dejaba el dispensario, era para dedicarlas al exámen de nuestros casos especiales, visita de hospital y aún de noche teníamos que continuar nuestra labor.

En los últimos dias de Junio, el Dr. Tulio López Gaztambide, de Arecibo, vino á trabajar con nosotros. Por esta época aumentó de tal suerte el número de enfermos, que hubimos de rogarle permaneciera á nuestro lado, prestándonos su importante concurso, hasta que terminásemos nuestros estudios en Utuado.

Sin limitación alguna para la admisión de pacientes á nuestro dispensario, fué aumentando el número de 10 ó 12 con que empezamos, al de 125 ó 150 que por primera vez venían diariamente; y este número unido al de los casos en tratamiento que volvían á ser reconocidos y á llevar sus medicinas, hacían un total de 300 y 600 en muchos días. No hemos de hacer mención del ímprobo trabajo de una clínica de esta naturaleza, ni del dispendio de energías que origina. Teniendo en cuenta que los pacientes antiguos debían ser preferidos, y deseando continuar tanto como se pudiera su tratamiento, se anunció que á partir del 23 de Julio, ningún solicitante de primera vez sería atendido. Después de esta fecha, solo algunos casos se registraron: aquellos á quienes era imposible negar los auxilios de la medicina.

La misma categoria de enfermos que en Bayamón, tuvo acceso al hospital en Utuado, aunque aquí, el número de casos graves fué mayor. Aquellos á quienes se les hacía semanalmente el exámen completo de su sangre, permanecieron en las tiendas ó muy cerca donde podían ser atendidos. Como diariamente nuevos enfermos solicitaban ingreso al Hospital, la falta de camas llegó á ser un problema, que resolvimos trayendo los ya mejorados á la casa donde improvisaban su lecho para pasar la noche. Durante algunas semanas, hubieron tantos albergados en la casa y en los edificios contiguos como en las tiendas. Ante avalancha tal de necesitados, tuvimos forzosamente que pasar por alto las reglas que gobiernan y rígen toda organización de este género.

La hemoglobina se estimaba cuando el sujeto había expulsado todos sus parásitos y era, aparentemente, la coloración de su rostro normal. Si entonces, el exámen cromométrico acusaba un 85%, se consideraba al enfermo curado y se le daba de alta. Este exámen, diariamente practicado en un buen número de casos, era un trabajo de importancia, en el que nos ayudó eficazmente D. Octavio Jordán, de Utuado, estudiante de Medicina en Jefferson College, de Philadelphia. En los últimos dias, se fué avisando á los pacientes que el dispensario se clausuraba y que por tanto no debían volver. Los enfermos que quedaban en el Hospital, imposibilitados todavía para trasladarse á pié, fueron enviados á sus casas á caballo.

Durante nuestra permanencia en Utuado, el Dr. Isaac González Martínez, de Mayagüez, estuvo diez días trabajando con la Comisión y haciendo un estudio especial de los casos de bilharziosis que habiamos registrado en aquella población.

Nuestro campamento en Utuado, fué visitado por algunos prominentes touristas y elevados funcionarios del Gobierno Insular, figurando entre estos últimos el Dr. José Gómez Brioso, Director del Departamento de Sanidad, Caridad y Prisiones; el Dr. Francisco del Valle, Presidente de la Junta Superior de Sanidad; el Hon. Pedro Juan Besosa y Hon. Manuel Pérez Avilés, Delegados de la Asamblea Legislativa, y otros.

En Julio 24, fuimos honrados con la visita del Gobernador de Puerto Rico, Hon. Beekman Winthrop, quien inspeccionó el campamento y se informó de los trabajos de la Comisión.

El 15 de Agosto, fué definitivamente suspendido todo trabajo clínico, habiendo inscrito 4,543 casos de uncinariasis y seis de otros padecimientos anemiantes en nuestros libros, en Utuado. Desde esta fecha, hasta el 19, la Comisión se ocupó en disponer el embalaje de lo perteneciente al Gobierno Militar y al Insular, para depositarlo en almacen ó trasportarlo á San Juan.

Gracias á la bondad del Comandante W. F. Lippitt, Cirujano encargado del Hospital Militar de San Juan, tuvimos en dicho edificio un hermoso salón para oficinas, y el 1º de Septiembre empezamos á compilar los numerosos datos de nuestras investigaciones, como trabajo preliminar del informe. Dos meses invertimos en esta labor, y el de Noviembre, lo empleamos en redactar la presente Memoria.

Terminadas nuestras investigaciones y fijado nuestro criterio, creimos oportuno recoger la opinión de los profesionales de la Isla, acerca del padecimiento que estudiamos, y al efecto, se envió á los Sres. Médicos, la carta-circular siguiente:

San Juan, P. R. Septiembre 12, 1904.

SR. DR...

....

Distinguido Compañero:

La Comisión encargada del estudio de la Anemia en Puerto Rico, próxima á terminar su labor desea, al emitir su informe, recoger la autorizada opinión del Cuerpo Médico de la Isla acerca de ciertos particulares que á la índole de su trabajo afectan. Es nuestro propósito, sumar los datos valiosísimos de la investigación y la experiencia de nuestros compañeros que han tenido oportunidad de conocer de un padecimiento generalizado en la población rural de Puerto Rico, y cuyos datos tendrán para esta Comisión el valor inestimable de ser facilitados por los que vivamente interesados en las conquistas de nuestra ciencia, se aperciben al mejoramiento social de esta Isla. Y, confiando en que Vd., interesado como todos en esta obra de interés capitalísimo, le prestará su concurso decidido, nos permitimos dirigirle la presente con el cuestionario adjunto, que podrá Vd. ampliar en todo aquello que lo crea pertinente, rogándole se sirva darle contestación.

Anticipando á Vd. las gracias, nos suscribimos de Vd.,

Atentos S. S. y compañeros.

PEDRO GUTIERREZ IGARAVIDEZ, M. D.

W. W. KING, *Passed Assistant Surgeon,*
Public Health and Marine Hospital Service.

BAILEY K. ASHFORD, *Captain and Assistant Surgeon,*
United States Army.

Members of Anemia Commission.

CUESTIONARIO.

1.—Cuál, á juicio de Vd., es la causa principal de la Anemia que sufre el campesino puertorriqueño?

....

2.—Sabe Vd. que el nematodo, uncinaria duodenalis ó uncinaria americana existe en Puerto Rico, y tiene noticias de su difusión en la Isla?

....

3.—Cree Vd. que este parásito intestinal produce anemia?

....

4.—Cree Vd. que en el supuesto de que la uncinaria origine anemia y de que haya sido encontrado en este país y difundida en la Isla, pueda ser causa de la anemia que padece el campesino de Puerto Rico?

....

5.—Ha tenido Vd. casos de uncinariasis bajo su observación, en los que ha usado timol ú otra droga para la expulsión del parásito?

Sírvase contestar, en caso afirmativo, qué droga ha usado, modo de administración, número de veces que en cada caso la ha administrado y qué resultado ha obtenido con su tratamiento.

....

Aun cuando las anteriores preguntas se refieren solamente á la experiencia clínica, la Comisión estimará en mucho los informes de aqnellos compañeros que hubieren llevado sus investigaciones al laboratorio.

De las 169 circulares remitidas, no merecieron contestación, por razones que ignoramos, 122. A los compañeros que cortesmente se sirvieron emitir su franca opinión, en asunto de tanta importancia para la clase médica de la Isla, nuestra mas sincera gratitud.

Las respuestas al cuestionario fueron clasificadas en esta forma:

1.—23, indicaron la uncinaria; 16, alimento insuficiente, falta de higiene, clima, ú otras causas de esta naturaleza solas ó asociadas; 6, asociando los dos grupos de causas con más ó ménos igual importancia: 2, no concretas.

2.—Una, negativa; las otras, afirmativas.

3.—Todas afirmativas, excepto 3 que niegan su poder *per se*, salvo asociación con otros estados ó causas predisponentes.

4.—37, afirmativas : muchas basándose en referencias, y atribuyéndola á otras causas; 8, aparentemente estimando iguales ó más importantes, otras causas que la uncinaria; 2, no concretas.

5.—36, usaron timol en uno ó más casos, no mencionando algunos como causa principal, el factor parasitario. 1, usó helecho macho; 10, sin experiencia personal. Con ligeras excepciones, el resultado en general satisfactorio.

La reseña que precede demostrará, cómo la Comisión ha procurado llenar los deberes que se le confiaran, estudiando y tratando la enfermedad conocida en Puerto Rico con el nombre de Anemia, y, apoyándose en los datos de su investigación, que al orden científico corresponden, y que forman el texto de esta Memoria, establece aquí las conclusiones siguientes:

La enfermedad conocida con el nombre de Anemia en Puerto Rico, es solo un síntoma debido á alguna entidad patológica definida, ó á la pertubación del acto fisiológico, por una causa común alimenticia, climatológica, química, etc.

Excluidas estas causas comunes, por la comprobación de una enfermedad específica, la *uncinariasis*, bastante á producir ese síntoma; y, obtenida la desaparición de él, por el solo tratamiento de la enfermedad, sin modificar la acción posible de dichas causas comunes, entendemos; que la anemia que sufre el campesino puertorriqueño, es debida en el mayor número de casos, á dicha *uncinariasis ó anquilostomiasis.*

Este padecimiento reconoce por causa, la presencia y coexistencia en el intestino del hombre de un pequeño gusano *(la uncinaria).*

Este gusano-parásito llega al organismo en estado de larva; y su vía de entrada es, generalmente, la piel.

La enfermedad provoca un estado de empobrecimiento orgánico tal, que conduce á la total pérdida de energías para todo trabajo y á la muerte, dentro de un cuadro de variadas complicaciones.

La dolencia aqueja al 90% de la población rural de Puerto Rico, y en toda la Isla se padece.

Con número tal de invadidos, no es aventurado pensar que esto afecte al status social y económico del país.

La enfermedad es curable en el mayor número de casos; y es susceptible de restricción dentro de los elementales principios de la Higiene, y por el tratamiento y curación de los enfermos existentes.

Los pocos casos en que el síntoma anemia obedeció á otra enfermedad ó estado fisiológico especial, son los mismos que en todos los paises y por idénticos motivos se registran; y hacen resaltar más el factor parasitario, en la mayoría encontrado, como causa principal productora de dicho síntoma, robusteciendo de ese modo nuestra opinión, y afirmando nuestra creencia, de que en general la anemia que sufre el campesino puertorriqueño, es consecuencia de la infección por uncinaria.

Ahora bien; estas conclusiones nos llevan á considerar, como último término del asunto, el problema de la profiláxis bajo el punto de vista de la intervención de los poderes públicos. Y, aunque no difícil de resolver, árduo es el problema, por tratarse, como se trata, de un padecimiento que afecta á la clase proletaria del país, cuyo estado económico no le permite seguir los consejos de la Higiene, ni recibir los recursos de la Medicina.

Más, como esa clase menesterosa, que en el aislamiento de su choza vive, sufriendo los rigores de una miseria que las más de las veces la misma enfermedad engendra; y ese labriego, tildado de indolente y apático que saca energías de su arruinado organismo para ganar jornal mezquino, cuando en cualquier país del mundo sería un enfermo que la Caridad recoge y que la Ciencia cura; son los que constituyen las fuerzas vivas del país, y son los portadores y sostenedores de una grave enfermedad que amenaza invadir toda la Isla, hácia ellos debe encaminarse el consejo del higienista, y el remedio del médico. Y este consejo, y este remedio, reclámalos con tal urgencia la población rural de Puerto Rico, que la Comisión entiende, llegado el momento, de que, por los encargados de la Administración, se tomen las medidas conducentes á combatir esta endemia, que roba los mejores brazos al trabajo, lleva el infortunio á los hogares, depaupera los organismos hasta influir poderosamente en la degeneración de la raza y eleva, de modo alarmante, la cifra de mortalidad en nuestras estadísticas demográficas.

El estudio detenido de nuestra estadística, que hace elevar el número de casos por nosotros tratado á 5,490, en su mayoría procedentes de los distritos mas pobres de la Isla, nos autoriza á desechar, por desprovista de todo fundamento científico y de toda formal prueba, la aseveración vulgar, de que el régimen alimenticio de nuestro campesino, sea la causa principal de su profunda anemia; haciéndole aparecer víctima de la inanición, en medio de una tierra fertilísima, y en el seno de una Sociedad hospitalaria, cuando no es mas que un enfermo en todo tiempo olvidado y en ninguna ocasión cuidadosamente atendido.

Aprovechando las sabias enseñanzas de Europa y los Estados Unidos, donde padecimiento igual ha hecho grandes estragos al punto de preocupar seriamente á los Gobiernos, hemos de dar á la profilaxis un caracter preceptivo de orden individual, y otro colectivo y público, manteniendo sobre ambos, por las condiciones especiales del país, la gestion de la Beneficencia. En otros términos: hay que vulgarizar el concepto de la enfermedad, popularizando los medios de precaverse de ella; hay que dictar medidas sanitarias, tendentes á evitar la propagación de la dolencia; hay que curar los enfermos infectados, que son en su mayoría insolventes.

Con la publicación de un folleto, que habría de repartirse profusamente, explicando de modo sencillo y claro lo que es la enfermedad, se lograría vulgarizar su concepto; llevando de paso la esperanza al pobre enfermo que, hasta ahora, se ha creido incurable por no poderse proporcionar un régimen dietético especial.

Y, si en este folleto se hace constar además, cómo por la costumbre de defecar en el suelo, es que los individuos infectados llevan á la tierra los huevecillos de los parásitos que anidan; cómo estos huevecillos se desarrollan precisamente por quedar las heces al descubierto, y dan lugar á una larva (la mazamorra), que pasa al hombre generalmente por la piel para ser, en último término, el gusano que produce la enfermedad; se llegaría á poner de manifiesto el verdadero agente, y su modo de propagación, despertando al mismo tiempo la idea y el interés de la defensa. Cabe dentro de estas consideraciones, el pensamiento del Dr. A. Stahl de fiar á los profesores de instrucción sobre todo á los de los campos, una parte en esta propaganda, invitándoles á colaborar en esta obra, de enseñanza tambien, no solo en sus planteles sino donde quiera que su autorizada palabra alcance.

Las medidas sanitarias, de orden general, llevarían á hacer obligatoria la construcción de letrinas (rústicas, de poco costo) en todas las casas y bohíos del campo que de ellas carezcan; y al uso de las mismas ya portátiles, ya fijas, en toda finca de café, hacienda de caña, plantación mayor, obras públicas, etc, donde quiera que un número mayor ó menor de trabajadores se congregue; restringiéndose de este modo, la difusión de la larva en los terrenos de cultivo. Instruida la policía en la verdadera causa de la enfermedad, ella sería una poderosa propagandista de estas medidas higiénicas, cuya observancia tanto interés entraña.

El uso de agua hervida ó filtrada no merece, por lo que á este fallecimiento se refiere, especial mención.

La desinfección del suelo, ora por agentes físicos, ora por sustancias químicas, ni es factible ni se obtienen los beneficios de ella esperados. Todas las autoridades en la materia le conceden escasa importancia por la ineficacia del resultado.

En cambio, al tratamiento de los invadidos préstanle preferente atención, y Bruns estima, que es el único medio de hacer efectiva la profilaxis. Mas, para realizar ese tratamiento aquí, donde en general la masa infectada es insolvente, la organización de la Beneficencia Municipal es imperfecta; no cuentan los Municipios con recursos suficientes; en muchos, ni médico hay ni medicinas se encuentran y, no ha de ser, seguramente, de ese modo, como se logre combatir la plaga que nos azota.

Hoy por hoy, la gestión del Gobierno se impone; y á él toca acometer la empresa con decisión y energía.

La demanda de asistencia y medicamentos por y para enfermos anémicos, es actualmente considerable en las ciudades donde la Comisión estuvo, lo que prueba la eficacia del régimen instituido; pero esas Municipalidades, no pueden subvenir de modo alguno los gastos de los facultativos necesarios, ni suplir los medicamentos prescritos, ni albergar en sus pequeños hospitales los casos graves que, en abundante número, en sus comarcas existen.

Y, como esa demanda, con igual intensidad, se dejará sentir muy pronto en toda la Isla, como se siente ya en otras ciudades y pueblos donde el esfuerzo de médicos entusiastas, ayudados por la Caridad, se dirije á combatir la endemia con resultados brillantes, aún dentro de limitadas condiciones, á la Administración toca sumar esos esfuerzos en provecho común.

Tratándose de combatir esta dolencia, la Comisión cree, que solo en una organización científica, metódica, por el gobierno sostenida, que fuere á cooperar con los Municipios en sus capítulos de Beneficencia, hallaría formal apoyo la campaña que se emprendiera.

Esta organización podría fiarse á una junta que estableciera una estación central, con hospital anexo trasportable, que funcionara durante tiempo determinado en cada distrito y fuera preparando estaciones secundarias, en puntos convenientes, hasta dejar establecido un sistema completo de Dispensarios y Asilos, para el tratamiento exclusivo de la enfermedad.

Estas estaciones, convenientemente equipadas y por personal idóneo dirigidas, estarían en comunicación con la Central para los efectos de la estadística, á la que habría de concederse atención preferente. En no lejanos días, estos pequeños centros, sobre base científica levantados, serían el núcleo de los futuros Hospitales Departamentales, que en todo momento, responderían á los progresos de la Ciencia en beneficio de la Humanidad.

La obra es grande, y grandes, por tanto, han de ser los esfuerzos; sin que, espiritus impacientes, la crean hacedera en poco tiempo y extinguida en breve la enfermedad en Puerto Rico. Los resultados dependerán de un sistemático y persistente trabajo empezado en pequeño, gradualmente extendido y tan rápidamente generalizado como las circunstancias lo permitan. Algunos años se necesitarán hasta obtener una perfecta organización; pero la importancia de la empresa y el producto de los recursos empleados, se reflejará cada año en la baja de la cifra de mortalidad, en el aumento de la de trabajadores sanos y fuertes y en la reducción de solicitudes á la Beneficencia pública.

Es terreno vedado para nosotros, la fuente de donde emanen los recursos necesarios para esta obra; ni nos toca tampoco discurrir acerca de los gastos que origine, y, aun cuando no escapa á nuestra consideración el estado económico del país, entendemos que el higienista y el médico frente á frente del mal que han de prevenir y curar, ni pueden ni deben ajustar sus ideas salvadoras con detrimento de los principios inmutables de la Ciencia, á la financiera condición de un pueblo. Quede para otros, armonizar las exigencias de aquella intuición latina "salux populi suprema lex" con el estado precario de un contingente de enfermos, que constituye en Puerto Rico, el noventa por ciento de su población rural.

Es justo consignar aquí, el importante concurso prestado á este estudio de la Anemia en Puerto Ricó, por los Jefes médicos del Ejército y del Servicio de Sanidad y Hospitales Marítimos de los E. U., destacando á sus oficiales para este trabajo y poniendo á nuestra disposición el instrumental necesario y todas las publicaciones solicitadas. Así mismo, hemos de manifestar nuestro agradecimiento á todos aquellos que desde las esferas oficiales, en el terreno profesional, ó en el orden privado, han contribuido á la labor de la Comisión. Entre los primeros están el Gobernador Beekman Winthrop, Ex-Gobernador Wm. H. Hunt, Secretario Régis H. Post, Ex-Secretario Charles Hartzell, y Mr. Scott Truxtun, del Gobierno Insular. Entre los segundos, nuestros compañeros los Drs. W. F. Lippitt, Comandante Cirujano del Ejército, José Lugo Viña, Médico del Regimiento Insular; Tulio Lopez Gaztambide, Agustin Stahl, Isaac Gonzalez Martinez, Rafael Cesteros, Santiago Veve, Fernando Nuñez, Antonio Guijarro, Rafael Gatell, Felipe Vizcarrondo, Francisco Hernandez, y Octavio Jordán. Y, entre el número de amigos distinguidos, Don Ramón Fernandez; Don José Tibot, Alcalde de Bayamón; Don Pedro Rivera Collazo, Alcalde de Utuado y otros muchos mas.

La cantidad de $5.000 puesta á disposición del Gobernador en el Tesoro de Puerto Rico, fué gradualmente retirada para cubrir las atenciones de la Comisión. Prévia autorización del Gobernador, los fondos necesarios para el gasto mensual eran girados al Depositario de la Comisión y, mensualmente también, las cuentas de ésta se enviaban al Auditor de Puerto Rico para su aprobación. La adjunta relación de gastos, es copia de los documentos que obran en Auditoría.

Queda, como puede observarse, un remanente de $45.16, aún cuando el Miembro Insular de la Comisión, no ha percibido los haberes correspondientes á los meses de Octubre y Noviembre.

Para mayor facilidad, hemos agrupado los gastos por Partidas incluyéndolos en una relación mensual.

En la partida que llamamos *Gastos de Instalación*, comprendemos todos los originados durante la instalación del campamento en cada localidad; jornales de carpinteros, peones, etc., así como la compra de los pisos portátiles para las tiendas y aquellos utensilios de Hospital que no fueron suministrados por el Departamento de la Guerra.

En la de *Trasportes*, incluímos todos los gastos que por virtud del traslado del campamento de un pueblo á otro hubimos de hacer, y aquellos otros inherentes al servicio de la Comisión, como acarreo de medicamentos, conducción de materiales para laboratorio, trasporte de personal, etc.

La de *Provisiones*, se refiere á la manutención de los enfermos y empleados en el Hospital. El número total de raciones suministradas alcanza á 11,635 y mensualmente vá anotado en cada partida el número de los racionados.

Las de Administración y Empleados, y Personal técnico representan, como sus nombres lo indican, la retribución á los distintos funcionarios por sus servicios, y á la de *Miscelánea*, hemos llevado los gastos de accesorios para el laboratorio, el alquiler de casa para oficinas, y todas aquellas erogaciones de diversa índole, que no fueron incluídas en las partidas calificadas.

MES DE MARZO.

Gastos de Instalación.—		
Personal empleado en la instalación del Hospital.	13.63	
Material: utensilios para el mismo incluyendo 10 pisos para tiendas	323.54	337.17
Trasportes.—		
Acarreo del material desde San Juan á Bayamón.		17.29
Provisiones.—		
Las adquiridas para 1,218 raciones		129.45
Medicamentos.—		
Los suministrados por el Dispensario y Hospital..		46.51
Administración y Empleados.—		
Sueldos del practicante, ama de llaves, enfermeros, etc		79.94
Personal técnico.—		
Asignación del Miembro Insular de la Comisión: desde el 5 al 31		130.65

MES DE ABRIL.

Medicamentos.	142.85
Provisiones.—	
Para 1,850 raciones	236.96
Trasportes.—	
Viajes de la Comisión	20.97
Administración y Empleados	105.00
Personal técnico.—	
Miembro Insular de la Comisión	150.00
Miscelánea.—	
Accesorios de laboratorio, jornales de peones, lavado de ropa, etc	33.28

MES DE MAYO

Trasportes.—	
Los de la Comisión y material de Hospital, desde Bayamón á Utuado	146.28
Provisiones.—	
Para 1,131 raciones	210.08

Gastos de instalación.—		
Personal y material, y alquiler de casa para oficinas		30.80
Medicamentos		111.59
Administración y Empleados		48.40
Personal técnico.—		
Dr. A. Stahl; Bayamón	50.00	
Miembro Insular de la Comisión	150.00	200.00
Miscelánea		20.74

MES DE JUNIO.

Medicamentos		30.37
Provisiones.—		
Para 2,536 raciones		364.89
Trasportes.—		
Viajes de la Comisión y acarreo de medicamentos.		18.85
Administración y Empleados		77.00
Personal técnico.—		
Dr. A. Stahl; Bayamón	25.00	
Miembro Insular de la Comisión	150 00	175.00
Miscelánea.—		
Alquiler de casa, etc		32.93

MES DE JULIO.

Medicamentos		275.21
Provisiones.—		
Para 3,948 raciones		410.73
Trasportes.—		
Acarreo de medicamentos		41.83
Administración y Empleados		92.00
Personal técnico.—		
Dr. T. López Gaztambide; Utuado	80.00	
Miembro Insular de la Comisión	150.00	230.00
Miscelánea.—		
Alquiler de casa, etc		34.94

MES DE AGOSTO.

Medicamentos		269.80
Provisiones.—		
Para 952 raciones		141.77
Trasportes.—		
Regreso de la Comisión á San Juan y acarreo de equipajes, etc		88.37

Administración y Empleados		50.50
Personal técnico.—		
Dr. T. López Gaztambide	40.00	
Miembro Insular de la Comisión	150.00	190.00
Miscelánea.—		
Alquiler de casa, accesorios de laboratorio, etc.		34.73

MES DE SEPTIEMBRE.

Personal técnico.—	
Miembro Insular de la Comisión	150.00
Miscelánea.—	
Estancia en el Hospital Militar, de uno de los enfermos en observación	6.00

MES DE OCTUBRE.

Administración y Empleados.—	
Un mozo para limpieza de las oficinas	2.00
Miscelánea.—	
Utensilios de laboratorio (mes de Agosto)	22.00

MES DE NOVIEMBRE.

Miscelánea.—	
Efectos de escritorio, etc	14.36
Trasportes.—	
Una caja de medicamentos	1.60
Administración y Empleados.—	
Mozo para el servicio de las oficinas	2.00

RESUMEN.

Gastos de Instalación	367.97
Trasportes	335.19
Provisiones	1,493.88
Medicamentos	876.33
Administración y Empleados	456.84
Personal técnico	1,225.65
Miscelánea	198.98
	4,954.84
A balance	45.16
	5,000.00

LA UNCINARIASIS.

SU CONCEPTO.

Es una enfermedad específica, infecciosa, propia de los paises tropicales é inter-tropicales, de posible localización en las zonas templadas; que afecta á los individuos que estan en íntimo contacto con tierra, lodo, ó cieno infestados de larva de uncinaria duodenalis, ó uncinaria americana; caracterizada por una insidiosa y progresiva anemia, debilidad, trastornos nerviosos y digestivos; susceptible de curación por la expulsión del parásito, y de restringirse, impidiendo que las deyecciones de los infectados sean depositadas en campo libre, y esparcidas por la tierra.

TERMINOLOGÍA.

Los distintos nombres que á este enfermedad se han dado, aparecen bajo este mismo epígrafe en la edicion inglesa, y hácia ella remitimos al lector que desee conocerlos; puesto que á nada conduce repetirlos aquí, cuando habrían de ser simplemente copiados, para conservar las mismas palabras de los idiomas en que se expresaron.

OJEADA HISTÓRICA.

La Uncinariasis, como proceso morboso de causa genética conocida, no ha figurado en los cuadros nosológicos de la ciencia del diagnóstico hasta hace poco tiempo. Pero, si relacionamos el concepto actual de la enfermedad con el que de una análoga, por su sintomatología idéntica, tuvieron en diversos paises distintos observadores, habremos de comprender que, esta afección, dejóse sentir en la antigüedad; aun cuando su verdadero factor etiológico fuera ignorado, hasta el descubrimiento del anquilóstoma duodenale por Dubini.

LA ENFERMEDAD ANTES DE 1838.

Discurriendo por la Historia de la Medicina, es en el famoso Papirus de Ebers (1550 antes de nuestra Era), donde encontramos, en orden de antigüedad, la primer noticia de este padecimiento; pues en dicho manuscrito, según Joachim, se habla de una dolencia clínicamente similar á la uncinariasis, y que los egipcios atribuían á parásitos intestinales.

Piso, en Brazil, en 1648; Padre Labat en Guadalupe, en 1748; Chevalier, en Santo Domingo en 1752; y Leracher, Dazille, y Bason en las Antillas, conocen una afeccion de igual cortejo sintomático. Bryon Edwards, en Jamaica en 1799, cita una gran mortalidad en los prisioneros debida á un padecimiento semejante á la uncinariasis; y en 1802 se conoció con el nombre de "Anemia de la montaña," una enfermedad parecida, con caracter epidémico, en las minas de Valenciennes y Anzin.

En 1833 Mr. Hamont, residiendo en Egipto, ridiculiza á los médicos franceses allí en ejercicio, porque trataban de curar la anemia por medio de 12 sanguijuelas aplicadas en el abdomen del paciente.

De lo que antecede se deduce; que aunque son escasos los datos que la historia en su fuente mas antigüa nos ofrece, podemos, no obstante, presumir que esta afección tuvo su cuna en Africa ó que, por lo ménos, de ésta viene el primer conocimiento de su aparición en el hombre; y, todos los escritores con anterioridad á 1838, acusan su existencia bajo nombres distintos; ya tomando de uno de sus síntomas mas caracteristicos motivo para nominarla Opilaçao como Piso, ó refiriéndose otros al supuesto factor etiológico que la engendra, para llamarla "Anemia de los Mineros".

LA ENFERMEDAD DESDE 1838 Á 1879.

Más, el verdadero fundamento científico de nuestro conocimiento en este asunto, data de un importante artículo publicado en una Revista Médica Italiana en 1843. Angelo Dubini, médico de Milan, lo suscribe y hace en él la descripción de un nuevo y curioso parásito; aun cuando no le atribuye definitiva significación patógena. Practicando una autopsia en Mayo de 1838, en una campesina de Milan muerta de pneumonia, encontró Dubini, un pequeño gusano en el intestino delgado, cuya cabeza penetraba profundamente en la mucosa. Su presencia en el duodeno, atrajo poderosamente la atención del observador á tal punto, que apesar de hallarlo también en el yeyuno, dió al verme por el descubierto el nombre de Agchylostoma duodenale; asignándole posible participación en la producción de las diarreas crónicas.

Siebold en 1845, clasifica al nuevo parásito; pero tanto los médicos como los zoólogos que del asunto tratan, lamentan el nombre impropio que se le diera. Stiles, eminente zoólogo de los Estados Unidos, cree que el de Uncinaria duodenalis es el legítimo que le corresponde; aceptando el de Uncinaria, que primeramente le dió Frölich en 1789. Por este nombre se le conoce en la literatura médica americana.

Un año después del artículo de Dubini, fué encontrado de nuevo el parásito por Castaglioni en Milan. Pruner en Egipto, en 1847, comprueba su existencia en las autopsias practicadas á individuos caquécticos, hidrémicos, y escrofulosos. Bilharz y Griesinger hállanlo tambien en casi todas las que llevaron á efecto y, el último, reconoce y declara por vez primera, que dicho verme causa la enfermedad que aflije á la cuarta parte de la población de Egipto. Wucherer en Brazil en 1866, estimulado por el trabajo de Griesinger, consagra sus estudios é importante literatura á esta afección; pero fuera de Rio Janeiro y Bahía, la incredulidad impera sobre el resultado de sus investigaciones. Por esta época, Sangalli practica varias autopsias para negar la condición hematofógica del parásito. Y, Grassi en 1877 que fué, á lo que parece, el primero que renoció el óvulo típico de la uncinaria en las heces fecales, insiste en que el verme es un gusano chupador de sangre, por lo que origina tan graves trastornos en la economía.

LA ENFERMEDAD DESDE 1879 A LA FECHA.

Dos años más tarde, en 1879, á un acontecimiento en la historia de la Ingeniería síguele otro en la historia de la Medicina. Nos referimos á los trabajos del túnel de San Gotardo y á la epidemia desarrollada entre sus obreros, conocida con el nombre de "Anemia del Túnel." Solicitada la atención de los médicos durante esta epidemia, fué entonces que el pequeño gusano descubierto en 1838, empezó á jugar papel importante en la etiología de la enfermedad. Miles de trabajadores sintieron los efectos desastrosos del mal; pero nadie pudo dar con su causa hasta que, en Febrero de 1880, Colomiatti, practicando la autopsia del cadáver de uno de dichos obreros, muerto en el hospital en Turin, encontró 1,500 uncinarias en sus intestinos. Sobre esta base anatomopatológica, Perroncito, Bozzolo, y otros dan principio á sus investigaciones, y ellos se encargan de dirigir la Cruzada contra la epidemia, considerada ya como de uncinariasis. Fué entonces que Bozzolo aplicó el timol como un excelente vermífugo para este parásito.

Mas, la génesis parasitoria de la "Anemia del Tunel," no fué aplicada por algunos, á una anemia parecida que sufrían los mineros y ladrilleros de otros países de Europa, donde se atribuía á las condiciones en que el trabajo se realizaba por falta de aereación y luz en las minas y, á desprendimiento de gases, etc.; tanto es así que, en 1885, se premiaba en Francia la tésis de Manouvrier, que estudiaba la "Anemia de los mineros," como originada por imperfecta ventilación de las galerías, atmósfera cargada de vapores procedentes de la combustión y destilación lenta de la hulla; en una palabra, como resultado lógico, de la vida especial del obrero y de la absorción de diversos productos tóxicos á que, por la índole de su labor, estaba expuesto; relegando á lugar secundario el parasitismo en su etiología.

Esto, no obstante, las minas de Valenciennes, Anzin y Saint Etienne aparecen infectadas; las de Chemnitz en Hungaria lo están también, y las de Sardinia y otras, saben ya el secreto de las epidemias que, en algunas épocas, devastaron su población obrera. Menche, refiere una endemia de *uncinariasis* en los ladrilleros de Bonn, que no habían tenido conexión alguna con el Túnel.

Semanas después, Leichtenstern, que va á la cabeza de la investigación en el asunto que nos ocupa, halla la enfermedad entre los ladrilleros de Cologne. Masius, Francotte, Firket, y Von Beneden en Bélgica, declaran existir una epidemia en las minas de Mons.

En distintos países de Europa aparece, pues, la enfermedad; en muchas cuencas mineras se deja sentir epidémicamente, y llega el momento de que, los grandes centros industriales se preocupen, y la profesión médica conceda mayor atención al pequeño verme. Durante los años 1895 y 1900, suscitáronse grandes discusiones acerca del poder patógeno atribuido al anquilostoma, y el último de los años citados, Europa se decide á declarar la guerra á este parásito, que así amenazaba la salud de sus clases trabajadoras, como influía de modo funesto en el status social y económico de sus centros productores. Los esfuerzos de algunas naciones en pró de esta campaña, se vieron coronados por el éxito más lisonjero. Pero, antes de mencionar las que iniciaron este movimiento y lo llevaron á la práctica, es oportuno que hagamos algunas consideraciones relacionadas con la distribución geográfica de la enfermedad, dejando establecido:

1.—Que la uncinariasis, es un padecimiento de los países tropicales é inter-tropicales, con focos endémicos en las zonas templadas, donde las condiciones de temperatura y humedad se aunan para permitir el desarrollo de la larva.

2.—Que las grandes zonas de la Uncinaria hominis, no están completamente exploradas; pues, apesar de la abundante literatura que del asunto hay, gran número de médicos no están relacionados con él y muchos excelentes clínicos, solo saben de la enfermedad el nombre vulgar con que se la designa, y algunos síntomas que, entre otros, la identican. Por lo que á ciertos países tropicales se refiere, esto, no tiene ya, escusa admisible.

3.—Que hay países donde la enfermedad es endémica en alguna de sus zonas; más como está limitada á ciertas profesiones ú oficios, no es fácil su peligrosa difusión. Así ocurre con Alemania, Francia, y Bélgica. De estos pàíses, no puede decirse lo que de Puerto Rico y otras regiones, donde la gravedad y extensión del mal son tan grandes que iguala, si no supera, á la fiebre amarilla en tiempos pasados.

4.—Que en ciertas localidades, se sabe que viven algunos infectados, de otras regiones procedentes; pero en donde, ni la ocupación de los mismos, ni la temperatura del lugar favorecen la difusión de la dolencia.

5.—Que hay, finalmente, sitios donde por las condiciones de clima, se supone que la enfermedad se padezca, pero en los que no se ha demostrado el parásito, ni los datos clínicos suministrados son suficientes para asegurar su existencia.

ESTADOS UNIDOS.

Bajo la protección de su gobierno, los Estados Unidos han realizado dos campañas contra la enfermedad. La primera, dirigida por el Dr. Ch. Wardell Stiles, Zoólogo del Servicio de Sanidad y Hospitales Marítimos, fué encaminada á determinar la frecuencia y extensión de la Uncinariasis, en los Estados del Sur. Él encontró generalizada la afección en estos Estados y, entiende que, muchos de los diagnósticos populares de *palidez*, *enfermedad de corazón*, *hinchazón*, *y caquexia palúdica*, deben ser radicalmente cambiados, porque son síntomas que á ella corresponden; creyendo además, que la proverbial indolencia de la población blanca pobre sea, en gran parte, manifestación de Uncinariasis. El segundo paso dado por dicho gobierno es, la importante ayuda prestada al trabajo iniciado en Puerto Rico, en Febrero del año actual. Aparte de esto, muchos estudios individuales se han llevado á cabo en distintos Estados de la Unión, que no podemos mencionar uno á uno, por temor de que omitamos involuntariamente alguno, cuando todos son igualmente valiosos.

EUROPA.

Tenholt, en su primera comunicación al Congreso Internacional de Bruselas de 1903, dice que "la Uncinariasis, es la cuestión palpitante del "dia: es la plaga ó azote de los mineros. Hállase en las minas y en los "túneles, donde el exótico gusano encuentra la temperatura, humedad, y "medio nutricio de su cuna: los trópicos."

Preocupadas las empresas industriales, intervienen los gobiernos de los principales Estados dictando reformas sanitarias para sus minas, y Alemania, Bélgica y últimamente Inglaterra, invierten fuertes sumas en el estudio y tratamiento de la enfermedad.

ALEMANIA.

Muchas partes de Alemania, han sido declaradas infectadas en épocas distintas á 1838. Sin embargo; cuando en 1886 Albers en Essen, y Löbker en Dortmund, en 1895, informaron que la enfermedad había invadido el distrito minero de Westphalia, que emplea cerca de 256,000 obreros, el terror se apoderó de ellos; y la más enérgica campaña dió principio en la localidad. Procedióse, con este motivo, á investigar los mineros anémicos, guiándose para ello por el color que ofrecían sus membranas mucosas, conduciéndoles luego á un hospital en Bochum, para examinar sus heces en busca del óvulo de uncinaria, y donde se les sometía al oportuno tratamiento. Muy pronto este hospital no tuvo cabida para el número de enfermos que demandaban asistencia. Las cifras siguientes incluyen los enfermos tratados desde 1896 á 1902.

Tabla 1.—

1896.—	107	casos	á	6.4	por	10,000	hombres	en	16	minas.
1897.—	113	“	“	6.2	“	“	“	“	32	“
1898.—	99	“	“	4.9	“	“	“	“	24	“
1899.—	94	“	“	4.4	“	“	“	“	27	“
1900.—	275	“	“	11.7	“	“	“	“	42	“
1901.—	1,030	“	“	40.6	“	“	“	“	65	“
1902.—	1,355	“	“	52.9	“	“	“	“	69	“

(El último año alcanza solamente hasta Octubre.)

En 1900, se empezaron á regar las minas para evitar explosiones, y al aumento de humedad, se debe la rápida elevación de la cifra de los infectados. Como resultado de las conferencias celebradas entre los médicos encargados de la investigación y los representantes de los Consejos de Administración de las minas, aconsejóse el uso de letrinas portátiles en todas ellas. Pero, apesar de estas medidas, la enfermedad iba en aumento. Entonces, fué cuando se apeló al laboratorio bacteriológico de Gelsenkirchen, y Bruns, Tenholt, y Löbker en consejo, adoptaron las siguientes resoluciones.

1.—que, ningun obrero sería admitido á trabajar en las minas, mientras no probara que estaba libre de la infección.

2.—que, se hiciera una investigación general para conocer el número de infectados.

3.—que, todo minero infectado habría de ser eliminado del trabajo hasta que probara estar libre del parásito.

4.—que, el exámen microscópico de las heces fuera practicado en la propia mina.

Y 5.—que, se eligiera una de las minas, donde aparentemente hubiera mayor número de invadidos, para determinar el modo mas fácil de extinguir el gusano.

La aceptación y adopción de estas medidas, fué un triunfo para el Consejo Médico. Hospitales provisionales, de pabellones barracas, fueron instalados en varias minas, y el enorme trabajo de examinar los obreros empezó. Bien pronto se pudo apreciar cuan extensa era la infección y, el Ministro de Comercio, representando al Gobierno, hubo de dictar Ordenanzas Sanitarias, que dicho Consejo inspiró, poniéndolas en vigor en Agosto y Septiembre de 1903, y haciéndolas cumplir extrictamente por la policía. Además, requirióse á todos los dueños ó encargados de minas para que, el 20% por lo menos de los obreros empleados, fueran reconocidos; informando de ello á la Administración Central de Dortmund. Y, en Octubre del mismo año, la policía de minas obligaba á los propietarios de las mismas, á enviar á dicha Administración el resultado de un exámen semanal practicado en 200 obreros, cuando ménos; no considerando al infectado libre de sus vermes, hasta que en tres sucesivos exámenes, se comprobara la ausencia total de ovas de uncinaria. De este modo tuvo Bruns, bajo la lente del microscopio, las heces fecales de más de 180,000 hombres. Ningún desinfectante del suelo se adoptó, porque, según las experiencias del mismo Bruns, todos eran ineficaces. La pérdida de jornal, por el tiempo que el obrero estaba sometido á tratamiento, se tuvo en cuenta, y las Compañías indemnizaron á sus trabajadores.

El Ministro de Comercio, en su informe anual de 1903, refiere el gasto de 3.000,000 de marcos, en adición á las grandes sumas con que contribuyeron las empresas mineras, para el estudio y tratamiento de la enfermedad y consigna, que nunca se hizo contra enfermedad infecciosa alguna, campaña más enérgica y entusiasta. En Abril, Mayo, y Junio de 1903, fueron encontrados 17,161 infectados, entre 18,8730 mineros. La estadística siguiente de alguna minas, demuestra el resultado de la investigación y como fué disminuyendo el número de los invadidos.

Mina de carbon Graf Schwerin: En el primer reconocimiento se encontraron 66.1% de infectados y 44.2% en el segundo.

König Ludwig:	38.1 %	en el primer exámen;	10.8 %	en el cuarto.
Graf Molke:	7. %	" " " "	.3 %	" " tercero.
Dannenbaum:	18.8 %	" " " "	5.6 %	" " quinto.
Hannibal:	38.5 %	" " " "	13.1 %	" " cuarto.
Shamrock:	33.4 %	" " " "	9.78%	" " "
Julia:	19.5 %	" " " "	.9 %	" "séptimo.
Von der Heydt:	17.9 %	" " " "	2.1 %	" " sexto.
Pluto:	7.72%	" " " "	.5 %	" " cuarto.
Erin:	80. %	" " " "	11.1 %	" " – –

Desde Enero 1° á Octubre 15 de 1903, fueron tratados 21,612 trabajadores de los que solamente el 6.8% estaban anémicos. En 86 minas recibieron más de un exámen general los 70,000 obreros que empleaban. De estos, 74 merecieron 2, 3, y 4 reconocimientos, y en 12 se hicieron 5, 6, y 7 veces. En 15 de Febrero de 1904 se supo, que la cifra total de infectados en estas minas, había bajado de 13,621 á 3,663, ó sea una disminución de 73% en nueve meses de trabajo. Apesar de que Bruns llama la atención hacía el hecho de que la única profiláxis práctica de la enfermedad es curar los infectados, se ha repartido entre los mineros literatura popular informativa del asunto, tendente á disminuir las probabilidades de infección.

BÉLGICA.

Los trabajos realizados aquí, se han llevado á efecto en Lieja, aunque no con la extención que en Westphalia. Cuando, el Secretario de una de las Sociedades Cooperativas notició que, los socorros por enfermedad pagados á los obreros que trabajaban en las minas, superaban á los de otros oficios, el profesor Malvoz, del Instituto Bacteriológico de Lieja, fué consultado y emitió la opinión de que, en el distrito minero, había una epidemia de uncinariasis, como ya en épocas anteriores varios observadores habían señalado. En 1899, el Gobierno nombró tres Comisiones para el estudio de la enfermedad; una para Lieja, otra para Charleroi, y otra para Mons. El Dr. Malvoz establece un pequeño hospital de 15 camas á cargo del Dr. Lambinet, exclusivamente para enfermos de *uncinariasis.* Desde Mayo á Noviembre de 1903, fecha á que alcanzan nuestros datos, fueron tratados 630 mineros de los que, 150 estuvieron en el hospital gastando proximamente £280. En las minas de Colard, Seraing, donde el 75% de los obreros están infectados, instalóse tambien un hospital capaz para 150 pacientes y, se obtuvo la dosis de medicamento, á un precio de 4 s. 10 d. En la mina Esperance-Bonn-Fortune, de Montegnée, y en otras de Mons, se dictaron medidas profilácticas, haciendo circular, además, entre los trabajadores instrucciones para precaverse de la enfermedad.

INGLATERRA.

En el informe que Haldane presenta al Gobierno inglés en 1903, con el estudio que se le confiara hacer de la Anemia en las minas de Dolcoath en Cornwall, declara que, se trata, de uncinariasis y que, esa Anemia, no era debida á la ventilación deficiente, ni á otras causas que se habían invocado para explicarla. Haldane y Boycott, de Oxford, publican recientemente un excelente trabajo, en el Boletín de Higiene, acerca de la enfermedad por ellos estudiada. Las medidas profilácticas propuestas son, prácticamente, las mismas que las de Westphalia.

De 63,000 mineros, se han encontrado infectados 12,157 ó sea, el 19.3%; que arroja un tanto por ciento más elevado que en Alemania, habiéndose reducido esa cifra, en Diciembre, á 4,819 ó sea, al 7.6%. Laméntanse los escritores citados, de la extraordinaria ignorancia en que se ha tenido esta enfermedad, refiriéndose á la epidemia de Cornwall y á los Estados del Sud de la América del Norte, donde, según Hirsch, era frecuente, á juzgar por las historias clínicas publicadas por médicos americanos. Más esto, como puede observarse, afecta por igual á ambos mundos; pues nosotros encontramos, hasta hace poco, á muy conocidos hombres de Europa, explicando la Anemia de los mineros, por fantásticas influencias de agentes químicos ó por caprichosas teorías de especiales condiciones de vida.

FRANCIA.

En este país, el trabajo de investigación se ha llevado á efecto por Calmette y Breton, Comisionados del Gobierno para el Distrito de Loire.

Hasta ahora, la principal preocupación está en las minas del Norte y Paso Calais, donde trabajan 80,000 mineros y existe un 2% de infectados. El Dr. Breton presentó en el último Congreso de Bruselas, una importante comunicación sobre este asunto, haciendo consideraciones sobre la seria amenaza que pesaba sobre Francia, con la propagación de la uncinariasis en sus distritos mineros.

AUSTRIA.

La epidemia de Brennberg ha sido combatida por el Dr. Goldman, con tal éxito, que, del 85% de los enfermos de uncinariasis que existían en 1896, on queda ahora mas que el 8%. El Dr. Emerich Toth, de las minas de Selmeczbánya y Körmöczbanya, hace constar que, con el solo cuidado de evitar que los obreros defecaran en la tierra, se logró evitar la enfermedad veinte años ántes, allí donde había hecho grandes estragos.

ESPAÑA.

Los primeros datos positivos, de que la enfermedad existe también en esta Nación, son de fecha muy reciente; aunque se sospechaba que, en la explotación de sus importantes minas, se padeciera. De tal sospecha participaba el Dr. Larra y Cerezo cuando, en un periódico político, y con motivo del ya referido Congreso de Bruselas, hizo un llamamiento á los médicos españoles para que expusieran sus investigaciones acerca del particular. El Dr. Codina, después, presenta á la Academia de Medicina de Madrid, en Mayo del año actual, algunos enfermos de anquilostomiasis y parásitos adultos, embriones, y huevos; reclamando la prioridad en la prueba anatomo-patológica y desarrollando, en brillante conferencia, la génesis y patología de la dolencia. Varios señores Académicos, intervienen en la discusión de tan importante tema y es opinión unánime, que debe concederse al asunto toda la atención que merece, tanto más, cuanto que esta enfermedad es un peligro terrible para la explotación de las ricas cuencas mineras de aquel país.

Séanos permitido señalar, en abono de estas investigaciones puestas sobre el tapete en España, la posible propagación de la dolencia allí, como consecuencia de la repatriación de muchos individuos que fueron indudablemente infectados, en estas Islas, y cuyo género de vida ó las condiciones del trabajo á que se dedicaron, les ha permitido difundir la larva en los terrenos de cultivo ó en las cuencas mineras.

AMÉRICA DEL SUR.

Desde muy antiguo se sabe que, el Centro y Sud América, están invadidos. Muchas cartas ha recibido esta Comisión, de distintos Estados donde prevalece esta enfermedad, aún cuando se le ha concedido poca importancia. En la Guayana Inglesa, Ozzard refiere que está generalizada.

LAS ANTILLAS.

Todos los escritores que del asunto se han ocupado, refieren la existencia de una peculiar y característica Anemia en estas Islas lo que ha dado lugar á que, en la literatura europea, se las considere infectadas. Mas, por lo que á Puerto Rico se refiere, ninguna investigación se ha hecho, ni ninguna prueba se tuvo de la existencia del parásito ántes de 1899.

En otros países, no mencionados aquí, se sabe que la enfermedad existe como son la India, Egipto, Japón, é Italia.

ETIOLOGIA.

EL PARÁSITO.

No hemos de hacer un estudio detenido de este entozoario, pudiendo nuestros lectores consultar las obras de Stiles, Looss, Perroncito, Leichtenstern y otros, que tratan con mas detalles el asunto.

Este helminto, corresponde á la clasificación zoológica siguiente:

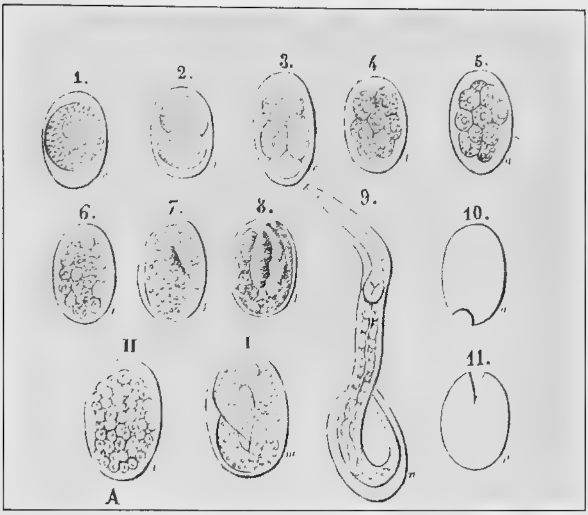
Orden, Nematodos; Familia, Strongylidæ; Sub-Familia, Strongylinæ; Género, Uncinaria; Especies, Uncinaria duodenalis y Uncinaria Americana (Stiles). Estas dos especies son las que originan en el hombre la profunda anemia que, unida á otros síntomas, constituye el complexus morboso, "Uncinariasis" ó "Anquilostomiasis." Hay otras especies del mismo género, que infectan á otros animales, teniendo algunos caracteres zoológicos distintos y comportándose como verdaderos chupadores de sangre, que ocasionan graves trastornos, según recientemente ha demostrado Stiles. Este autor refiere, que sufren fatales epidemias de uncinaria las ovejas, perros, zorras y especialmente las focas en Alaska, donde el 17% de sus cachorros, sucumben á consecuencia de esta enfermedad.

Ninguna de estas especies, sin embargo, es huésped del hombre; y salvo el chimpanzé y gorila, no otro animal es afectado por la uncinaria hominis.

Entre la uncinaria duodenalis del viejo mundo, y la especie encontrada por Stiles en el nuevo, existen importantes diferencias. La especie americana, tiene aparentemente menos tamaño que la europea; [U. Americana; macho, 7 á 9 m m; hembra, 9 á 11 m. m. de largo (Stiles); U. duodenalis; macho, 7 á 11.2 m. m; hembra, 7 á 16.5 m. m. (Leichtenstern).] En ambas especies, los sexos están separados y tienen órganos de generación completos.

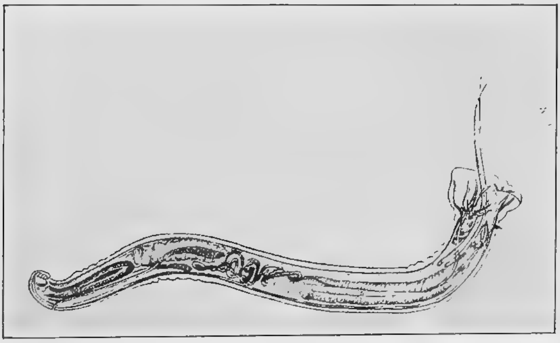
La cabeza está vuelta hacia atrás, lo que da al parásito la apariencia de gancho ó garfio. El carácter distintivo de esta clase de gusanos, es la porción terminal del macho, abierta en forma de umbrela, de donde parten dos tallos de quitina puntiagudos, llamados spículas; apareciendo en el fondo de esta bolsa, el pene. La extremidad caudal de la hembra es cónica.

La diferencia esencial, entre las dos especies, estriba: en la naturaleza de la cápsula bucal, y en el tamaño de los huevos. La uncinaria



STAGES OF DEVELOPMENT OF THE OVUM OF THE ANKYLOSTOMA DUODENALE.

ESTADOS DE DESARROLLO DEL HUEVO DE ANQUILOSTOMA DUODENAL



MALE ANKYLOSTOMUM DUODENALE. *(Photo from Manson.)*

MACHO DEL ANQUILOSTOMA DUODENAL. *(Fot. tomada de Manson.)*

duodenalis, tiene una robusta armadura bucal, compuesta de dos pares de dientes ventrales, encorvados como garfios, y un par de dientes en la pared dorsal. Sus óvulos miden 52 á 60 por 32 micro-milímetros.

La uncinaria americana, tiene en su cápsula bucal en vez de los dos pares de ganchos, dos pares de láminas semilunares ó labios quitinosos ventrales y un par de láminas dorsales de la misma naturaleza. Un diente medio, dorsal, proyéctase dentro de la cavidad bucal y, profundamente en la cápsula, se encuentran unas pequeñas lancetas, dos en la porción ventral y dos en la dorsal. Hay, además, algunas diferencias en la disposición de los rayos de la expansión caudal. Los huevos miden 64 á 76 por 36 á 40 micro-mm.

A simple vista, se pueden observar los parásitos en las deyecciones como pequeñas hebras de hilo de 0.75 á 1.5 cm de largo ó algo más, de color blanco, grisaceo, amarillo, ó rojizo oscuro; según el contenido del tubo intestinal ó de los órganos genitales. En nuestras observaciones hemos encontrado los machos de un color blanco pálido, y las hembras, blancas en las extremidades y con un tinte grisaceo en la parte media del cuerpo, debido á la presencia de óvulos en el útero.

DESARROLLO.

El óvulo, depositado en la tierra, se desarrolla á las 24 horas bajo favorables condiciones de humedad, temperatura, sombra, etc. Cada huevo expulsado en condiciones de vitalidad produce, si las ventajas del medio á ello concurren, la forma larvaria del verme; pero nunca el óvulo libera el embrión dentro del intestino del hombre.

Por tanto, la multiplicación de los parásitos en el aparato digestivo de su huésped, no se realiza; pudiendo un individuo albergar determinado número de gusanos mientras nuevas infecciones no aumenten el total de los existentes. Este es un punto importante para la prevención y cura de la enfermedad, que contrasta, con la conducta observada por otros parásitos en otras infecciones.

Desde que el embrión se liberta, hasta que alcanza el grado de madurez sexual, pasa por cuatro ó cinco estados larvarios, sufriendo diferentes mudas su piel. Después del quinto dia, es que empieza su segunda ecdysis ó muda, y llega al estado de invasión ó enquistación. La larva encapsulada (forma infectiva) tiene una longitud aproximadamente de 0.65 mm. por 25 ó 27 micromilímetros de ancho, ó sea, ménos de 1-10 del tamaño del verme adulto. Después de 4 ó 5 semanas siguientes á la infección, es que la larva alcanza su completo desarrollo. (Leichtenstern). Diez ó veinte gotas de agua pueden contener mil larvas.

Leichtenstern, Perroncito, y otros al principio, y últimamente Looss, Lambinet, y Bruns han hecho extensos estudios con cultivos del gusano. Los experimentos de Bruns y sus deducciones son las más interesantes, pudiendo servir de modelo por su cuidado y exactitud. Ellos abarcan los puntos esenciales, por los demás observadores registrados, con algunos hechos originales, y nos llevan á deducir consecuencias para la profilaxis.

Uno de los Miembros de esta Comisión cultivó el parásito en arena y tierra de jardín procedente de New York, y otro hizo cultivos con tierras de varios barrios de Utuado. Nuestras conclusiones no son definitivas, en cuanto á la predilección de suelo para el desarrollo del helminto.

Temperatura. La mejor temperatura para el cultivo de las larvas procedentes de los huevecillos es entre 25° y 30° Celsius; pero no siempre todos los huevos se desarrollan. A la temperatura de 27° á 31° Celsius, la larva vive perfectamente bien, cerca de seis meses, fuera del cuerpo de su huésped. Bruns refiere que al expirar este plazo, olvidó tapar el disco de cristal donde tenía el cultivo y habiéndose evaporado el agua, la larva murió. A una temperatura entre 20.2° y 20.8° Celsius la larva llega á su período de invasión, á los 18 días. Muchas de ellas quedan en libertad á los 4 ó 5.

Experimentando á la temperatura exterior en el verano, en Alemania, los cultivos tuvieron éxito. Después de 48 horas en la nevera, los huevos no germinan y una temperatura glacial mata á la larva en una hora. Veinte minutos de exposición á 50° Cel. matan también la larva y entre 50° y 60° Cel, la muerte es instantánea.

Oxígeno. Es un necesario elemento para el desarrollo del huevo, pues, cultivos aneróbicos no han dado resultado alguno al cabo de tres semanas. La larva, bajo esa condición, muere á los tres dias y se dice que mientras más joven, más pronto sucumbe. Claro es, según esto, que aparte de otras razones, los excrementos no son un buen medio de cultivo porque las fermentaciones que en ellos se originan, los hacen impropios para la vida del embrión. De aquí, la muerte de la larva, en las letrinas portátiles y la falta de peligro de las heces recogidas en depósitos adecuados.

Luz. Los huevos, expuestos á la luz directa del Sol mueren; empezando á descómponerse á los tres días. Para probar esto, Bruns expone los huevecillos á la luz directa y luego los lleva al incubador durante ocho días no obteniendo su desarrollo. Larvas muy jóvenes, antes de llegar al período infectivo mueren también á los dos días; pero las encapsuladas resisten bien.

Agua. 1.—En los excrementos no diluidos, las larvas aparecen á los cuatro ó cinco dias; pero se encontraron muertas á los diez dias sin haber llegado al estado infectivo.

2.—En partes iguales, de agua y materia fecal, los huevos maduran á los cuatro ó cinco días, y, las larvas encapsuladas se encontraron con movimiento á los diez.

3.—En una mezcla, de una parte de excremento por cuatro de agua la larva se encontró encapsulada á los seis días.

4.—Cualquier dilución hasta 1: 500, dá larvas encapsuladas á los cuatro días.

5.—Diluciones de 1: 1,000 á 1: 2,000 matan la larva é impiden el desarrollo de los huevos despues de haber permanecido en ellas seis días.

6.—La mejor dilución para un cultivo es de 1: 10 á 1: 100.

Bruns, explica la muerte de los embriones en las heces, aparte de la falta de oxígeno, por la gran cantidad de sales higroscópicas de los excrementos, que matan al parásito por sustracción de la cantidad de agua necesaria para su desarrollo. Él logra hacer estériles los óvulos en una solucion salina concentrada, al cabo de diez minutos. En esto se realiza, según él, una "plasmolisis" y encuentra que cuando los excrementos contienen un 50 ó 60% de materias secas los huevecillos mueren muy pronto, aunque las larvas encapsuladas tienen más resistencia.

Agentes químicos.—Bruns, despues de experimentar durante algugunos meses, con toda clase de desinfectantes químicos, no encontró uno, capaz de matar la larva encapsulada, cuya seguridad le permitiera aconsejarlo en la práctica. Sus experiencias le llevan á afirmar, que las sustancias que sustraen agua son mas ventajosas que los venenos. Lambinet, (Bull. Acad. Roy. de Medecin de Belgique (4) XV 1901, p. 397) halla que la inmersión en una solución de sublimado corrosivo, al 2% ó en una de lisol, al 3%, durante una hora, no mata los huevecillos; mientras que la glicerina ó una solución salina concentrada le es perjudicial. La larva, fué encontrada viva en una solucion de bicloruro de mercurio al 2%, despues de seis horas: tampoco murió en una de ácido sulfúrico al 25%, á los tres cuartos de hora.

Según esto, Bruns, cree, que debemos abandonar la esperanza de una desinfección por agentes químicos.

1.—Porque; tendrían que usarse en gran cantidad y su costo por tanto sería muy subido.

2.—Porque; aun en enormes cantidades no se lograría la muerte de todas las larvas en los terrenos infestados.

3.—Porque; tales agentes, para hacer efectivos, habrían de ser de una concentración y de un poder tóxico tan grandes, que afectarían á los trabajadores, en los sitios donde se emplearan.

El mismo autor referido, trató por diez veces de desinfectar parte de las minas con lechada de cal, y nunca lo pudo conseguir.

SITIOS Y MODOS DE INFECCION.

Los excrementos de individuos infectados, depuestos en campo abierto, llevan á la tierra los huevos del parásito; cuyos huevos, bajo las condiciones favorables ya apuntadas de sombra, calor, y humedad, liberan los embriones, y plagan de larvas el suelo. Así, se forman focos que se agrandan y se extienden á favor de las lluvias, y por la motilidad del verme; é invaden una zona, é infestan una localidad.

Por lo que á los campos de Puerto Rico se refiere, la génesis de infestación telúrica es muy clara. Junto á la choza, contiguo á la rústica vivienda, tiene en general nuestro labriego el pasto y la tierra por letrina. En los cafetales, durante las épocas de siembra ó recolección; en las plantaciones de caña, en todo cultivo, en una palabra, siempre recibe el suelo el abono de la materia pecante. No es extraño pues, que al lado de la casa, en el vecino platanal, al pie de los cafetos, en la tierra que trabaja, tenga nuestro campesino la fuente perpétua de su infección.

En esos sitios, todo favorece al desarrollo de la larva; humedad, calor y sombra se aunan para que rápidamente germinen los huevecillos, y pululen sus embriones por doquiera.

En ciertos parajes, la naturaleza les ofrece todavía mayores ventajas. Hojas y tallos caidos, principalmente de los plátanos, el fruto dañado que no se recoje, la cáscara abandonada, forman con la humedad natural del suelo, sobre todo en la estación de las lluvias, una masa que se descompone y el agua arrastra hácia la depresión del terreno, donde está el pequeño charco; que es, en último término, el cultivo puro de las larvas infectantes. Muchos de estos lugares, muchos de estos charcos son temidos por los jornaleros que saben están plagados de mazamorra.

Los campos dedicados á la caña, no son tan propicios para este proceso germinativo, porque roturados por el arado cada año, la acción directa del sol de una parte, y de otra, el quedar envueltos por la tierra, hace que ni huevos ni larvas prosperen.

La opinión de Stiles que cree los terrenos arenosos los únicos infestados, no puede ser admitida aquí. No fueron en esta clase de terrenos donde se infectaron el mayor número de los casos registrados por nosotros en Bayamón, sino que los habitantes de los barrios interiores dieron el mayor contingente. Cataño, poblado cerca de Bayamón, á la orilla del mar, debió habernos dado un alto número de invadidos; y solo anotamos once casos. Por el contrario, Naranjito y otros pueblos situados al interior, entre montañas, ricos en tierra de aluvion, dan elevadas cifras y sus casos de profunda anemia, no pueden ser comparados con los de los barrios de la costa. Utuado, es de suelo arenoso; pero la mayoría de nuestros pacientes procedían de sitios que no lo eran.

No son, pues, á nuestro juicio, las zonas arenosas aquí, las que ofrecen el medio nutritivo mejor; aunque sabemos, que en tales zonas la infección existe, pero no como en las arcillosas donde es raro encontrar un individuo que no esté infectado.

En resúmen: todos los terrenos de Puerto Rico son apropiados para el cultivo de la larva de uncinaria, si las heces encuentran la sombra necesaria para el desarrollo de los huevos.

Ahora bien; este parásito intestinal, no pasa por portador intermediario, es huésped directo de el hombre y á él llega, en estado de larva encapsulada, completando y terminando su desarrollo en el organismo humano.

¿Cómo invade al hombre? Dos, son los modos de infección; dos, las vias accesibles. Una, de antigua supuesta y conocida; la ingestión de la larva: otra, reciente, dudosa para muchos: la penetración de la larva por la piel y su emigración á traves de los tejidos, hasta su punto de elección: el pequeño intestino.

Consideremos estos dos modos de invasión.

Infección por ingestion de la larva.—La creencia de Leichtenstern, primero, de una posible infección oral, no nos lleva á admitir, que este sea el modo usual de penetración de la larva. Él dice, que son necesarias de cinco á seis semanas, para que alcance el parásito su madurez sexual; pero, falta explicar como el pequeño embrión mantiene su posición en el intestino, hasta que ese periodo llega. Grassi, opina que ellos se enquistan en el punto de su destino, opinión corroborada por Leuckhart, del mismo modo que lo hace el estróngilus equinum en su huésped, mientras se desarrolla.

Como muchas autoridades creen que éste sea el modo de infección, veamos si puede ocurrir en nuestras clases trabajadoras. Desde luego hemos de descartar la directa contaminación con las heces; primero, porque en los sitios donde se realiza, no quedan ya trazas del excremento humano y, segundo, porque el manejo de estas materias, no es frecuente y, cuando se verifica, se acompaña de inmediata limpieza.

En los hábitos del individuo que trabaja el suelo infestado, ó en el uso de sustancias portadoras de la larva, habremos de hallar el medio de invasión por la boca. La contaminación de esta por las manos enlodadas, al tiempo de comer; el uso de vegetales crudos y frutas enlodadas; el beber agua cenagosa ó que pase por canalizos de barro; tragarla inadvertidamente al bañarse en las quebradas; comer tierra; llevar las ropas enlodadas á la casa, que ensucian á su vez, las manos de la mujer y de los niños; el lavado de los pies, para quitar el lodo pudiendo infectarse las uñas de los dedos; el gateo y juego de los niños en la tierra, donde pueden ingerir algo de ella; el tocar ropas enlodadas momentos antes de comer; el uso de dulces, procedentes de casas donde no se observa gran limpieza; ciertas bebidas, como el guarapo, etc. son distintos medios, por los cuales cabe la posibilidad de una infección oral.

Mas, para que esta se realize, ha de mediar la ingestión de partículas de lodo, portadoras de la larva, y las experiencias de muchos observadores, y las nuestras propias, nos prueban que, la larva muere rápidamente, apenas se seca el medio que la sostiene. Los vehículos acuosos, solo á una determinada dilución de lodo, pueden mantener viva la larva, muriendo esta á 1:1000: precisamente en las condiciones en que tales vehículos no se utilizan, porque son instintivamente rechazados.

Por otra parte, nosotros sabemos de muchas personas infectadas, cuyos hábitos de vida no les han permitido de modo alguno, tener estas oportunidades de infección, habiendo sido indudablemente otras las puertas de entrada para el gérmen.

Infección por la piel.—En 1898, Looss, experimentando con cultivos de larva duodenalis en el Cairo, Egipto, incidentalmente notó que el simple contacto del cultivo con sus manos, le produjo una dermatitis. Examinó mas tarde sus excrementos y encontró los huevos del parásito; lo que le llevó á pensar que se había infectado por la piel ya que, viviendo seis años en el Cairo, sabía que en la Ciudad, era muy rara la uncinariasis, sobre todo, en las clases acomodadas.

En 1901, él confirmó, experimentalmente, su teoría. Sus experimentos fueron parcialmente repetidos por Grassi, Pieri, y Noe. Grassi, esparció tres gotas de agua infectada, sobre su antebrazo: Pieri, dejó ocho en su mano, hasta que se secaron, y Noe, cuatro. A los setenta y un días, Pieri se encontró infectado; más los otros nó; y todos entonces atribuyeron la infección de Pieri, á una invasión accidental por la boca.

En 1902, van Durme, prueba la entrada del estróngilo estercoralis á través de la piel de un conejillo de Indias.

En el mismo año, Bentley, describe unas pequeñas ampollitas, como una dermatitis de los climas tropicales, que afectaba á los peones y trabajadores de las Antillas inglesas, y á los de Assam (India), encontrando una larva joven de uncinaria, dentro de una de dichas vesículas. Bentley, nada dijo entonces de que la larva llegara á los intestinos atravesando la piel. Despues, en Abril de 1904, él cree en la posibilidad de que esto suceda despues de la infeccion y escribe: "otros escritores han confirmado este hecho, y es ahora aceptado, generalmente, tal modo de infeccion, alternando con la antigua teoría, de la infeccion por la boca. Yo no creo que esto ocurra mas que en raras ocasiones".

Boycott y Haldane, refieren que "New Sump bunches," es una dermatitis que sufren los mineros de las minas de Cornwall. Estos trabajadores, van calzados, pero llevan desnudo el cuerpo de cintura arriba.

Dichos autores encuentran identidad entre esta dermatitis y la descrita por Bentley y creen que, despues de los experimentos y la evidencia clínica de una infeccion de la piel, la invasión puede verificarse á través de esta.

El excepticismo de los autores italianos, frente á la teoría de Looss, llevó á éste en 1902 á repetir sus investigaciones, y son tan decisivas sus pruebas, tan magistralmente ha tratado el asunto que, para nosotros, está ampliamente demostrada la posibilidad de que se efectue por la piel.

Sus experiencias fueron seguidas por las de Claude A. Smith, Profesor de Bacteriología en el Colegio de Médicos y Cirujanos, de Atlanta.

Looss, llama la atención al hecho de que, Grassi, al poner el agua infectada en su brazo, dejó que se evaporara ántes que la larva pudiera penetrar, y que luego, secando rápidamente el sitio, la acabó de matar. Una de las objeciones hechas, por los experimentadores italianos, á la infección de Pieri es, que el número de larvas contenido en las ocho gotas de agua, era mucho mayor que el de parásitos, expulsados luego. Looss, sarcásticamente, dice; que mucho tiempo ha de pasar hasta que el Dr. Pieri sepa la última palabra de su infección, pues que, las larvas, no llegan todas al intestino, ni lo hacen al mismo tiempo. Unas, tienen mas activos movimientos que otras, y la larga distancia desde la mano al intestino, será recorrida por las mas diligentes; otras encontrarán obstáculos, que á las primeras no se presenten, y es razonable suponer que, algunas mueran en el trayecto. Refiere que en un conejillo que él infectara por la piel, encontró á los 14 días la larva, á corta distancia del punto de entrada, penetrando en los tejidos. Nunca la halló en los canales linfáticos.

Procediendo á una segunda serie de experimentos, infecta Looss, á un enfermero, de 26 años de edad, que llevaba seis años en el hospital de Sandwith y que no había salido del Cairo durante ese tiempo. Repetidos y cuidadosos exámenes de sus heces no probaron una prévia infección por uncinaria. Siete gotas de agua, fuertemente cargada de larvas, fueron depositadas sobre la muñeca, á lo que siguió muy pronto la típica erupción. Al día siguiente, todo el brazo estaba hinchado; y mucho picor se sentía en el punto de infección. A la semana la inflamación había desaparecido. Looss, comenzó á examinar los excrementos del sujeto, cuatro semanas después; al principio una vez, luego dos veces por semana. A los sesenta y un días, los huevecillos aparecieron en las heces. El lodo parece ser el mejor modo de infección, pues en los experimentos practicados con agua, es posible un fracaso debido á la rápida desecación del vehículo.

Looss, después, continúa sus experiencias con animales. Toma un perrito de tres meses de edad, le afeita un espacio de veinte centímetros cuadrados en la espalda, en cuya área aplica una capa de lodo infectado con larvas de anquilostoma canino. Sujeta un vendaje al rededor del cuerpo, á fin de que el perro lamiéndose no se infecte por la vía bucal. A las dos horas levanta el apósito, limpia la región y la lava con alcohol á 96 ° durante un minuto, matando de este modo las larvas excedentes é impidiendo así la infección por la boca. Investiga luego el lodo separado, y observa que, son en él las larvas, menos frecuentes que antes de ser aplicado: quedó solamente un sexto del total. El resto, dice Looss, las debía tener el perro.

Al noveno día, el animal presenta un cuadro típico de uncinariasis y al décimo muere. En la autopsia, un cuidadoso exámen de la piel, tejido subcutáneo y muscular no reveló la presencia de la larva. Los tejidos estaban exangües y todos los órganos aparecieron muy anémicos. En un trayecto de 30 á 50 centímetros, á partir del píloro, aparecieron puntos oscuros, que se señalaban en el intestino ántes de abrirlo, y en muchas partes mostrábase éste de un color rojo oscuro por fusión de dichos puntos. Abierto el intestino tales placas denotaron ser infiltraciones hemorrágicas. Un enorme número de larvas jóvenes, todavía encapsuladas, se hallaron nadando en sangre.

El canal intestinal, de veinticuatro de estos vermes, fué minuciosamente examinado y no se encontró sangre alguna. Looss, infiere, según esto, que la anemia de uncinariasis es debida á toxinas, y cree que, la penetración de la larva, se verifica por los folículos pilosos. Mas tarde, infecta otros dos perros de la misma edad: uno por la piel, y otro por la boca por medio de leche que contiene larvas. Uno murió de anemia á los diez días; el otro á los once.

Los brillantes experimentos de Claude Smith, corroboran estos hechos y prueban que, la piel, es también susceptible á la infección por uncinaria americana. Smith, pone tierrra infectada con larvas de cuatro días liberadas, sobre la muñeca de un hombre, no previamente infectado, y la deja por espacio de una hora. A los ocho minutos, la la muñeca empieza á picar, y separando la tierra, observa máculas. Al día siguiente, las pápulas estaban muy elevadas y la muñeca inflamada. Al otro día, el paciente refiere, que su sueño fué interrumpido por el contínuo picor local: las pápulas eran vesículas. El cuarto día, la inflamación se había extendido á los dedos; las ramazones alcanzaban al codo y el brazo era sensible á la presión. Al quinto día, las vesículas se hacen confluentes; el picor empieza á calmar: pero la inflamación llega al brazo y están sensibles los ganglios axilares. En el duodécimo día, ningún vestigio queda de la dermatitis. Se notó, al octavo día, un catarro de la garganta, con síntomas febriles. Desde entonces, empezó á sentir molestias en su estómago, que continuaron hasta el final de la cuarta semana. A mediados de la séptima, los huevecillos de uncinaria aparecieron en las heces. El experimentador observa que, con gotas de agua infectada, no se consigue la típica sensación de picor hasta los treinta y cinco minutos, en tanto que, á los ocho, se obtiene con el lodo; creyendo que este le sirva de apoyo á la larva, para penetrar en la piel.

También Smith, infectó el prepucio de un sujeto que había de ser circuncidado. A los cuatro minutos, el paciente, que no sabía nada de lo que se pretendía, y estimaba aquellas manipulaciones como preliminares de la operación, indicó que sentía como si una mosca por allí anduviera. Un minuto después, dijo, que parecía le atravesaban agujas en aquella parte. En otra ocasión puso lodo infectado sobre la piel de un sujeto. Retiró el lodo no encontrando en él las larvas, pero sí observólas sobre la epidermis.

Habiendo recorrido en detalle, todos los experimentos de nuestra literatura, relativos á la infección por la piel, discutimos al principio de nuestros trabajos en Bayamón la conveniencia de una prueba experimental, pero desistimos:

1.—Porque no creímos prudente abandonar la labor clínica de observación y tratamiento de nuestros casos, para dedicar el tiempo á comprobación de hechos, ya demostrados, por los mejores observadores.

2.—Porque, nuestra experiencia clínica, con este factor etiológico, en larga escala comprobado, supliría la demostración práctica de que la piel es, el punto usual de entrada del parásito al organismo.

3.—Porque, nos hubiera sido muy difícil hallar sujeto apropiado para la experimentación, libre de uncinaria y que, para evitar objeción á una infección oral, se hubiera mantenido á cubierto de ésta, interín se lograba el resultado.

Nosotros sabemos que será imposible excluir los otros medios de infección frente á esta última via; pero también confiamos en que futuras investigaciones harán más patente la teoría por nosotros admitida y á esta Isla aplicada de que la Uncinaria hominis pasa á través de la piel, siguendo un curso más ó menos directo, hasta llegar al intestino, su punto de elección. Esto, podrá parecer extraño; pero no es más que un fenómeno como otros tantos que la naturaleza registra y que el hombre estudia y que se realiza, como se realiza la emigración de la triquina desde los intestinos á los músculos; como la génesis de filariosis, con peregrinación de embriones á la sangre periférica en horas determinadas de la noche; como se realiza, en fin, el ciclo evolutivo de muchos organismos, parásitos del hombre y de los animales.

Por lo demás, estudiando los modos de infección vemos que la piel es puerta abierta para aquella y en ciertos casos no nos ha sido posible hallar otra.

Y si observamos que en el interior de la Isla, en los distritos cafeteros, en aquellas localidades donde hay plantaciones que dan abundante sombra, es donde el azote de la anemia se hace sentir de modo cruel; y que en tales zonas reina la mazamorra, sobre todo, en la estación de las lluvias, causando repetidas dermatitis, habremos de comprender que la larva encuentra en el pié desnudo de nuestro jornalero la puerta franca que le dá acceso. Por una historia de probable infección oral, miles atestiguan repetidos ataques de mazamorra. Cierto es que á muchos desagrada la probabilidad de haber ingerido, inadvertidamente, el lodo que llevara la larva; pero también es cierto que otros ocultan haber tenido mazamorra por que estiman que esa confesión delata un descuido imperdonable, una infracción de los hábitos de personas acomodadas, acaso una costumbre vituperable, tal vez la pobreza que obliga en ocasiones á llevar descalzo el pié. Nosotros sabemos que muchos que nos han negado esa dermatitis ó no recuerdan el ataque ó se amparan en la negativa, del juicio que imaginan habríamos de formar si nos la declararan.

En ciertas personas cuya vida no es la del pobre jíbaro que está en diario contacto con el suelo, la invasión de mazamorra la encontramos durante un baño en las quebradas al pisar el lodo de la orilla. Casos de crónica uncinariasis hemos tenido en individuos que siempre habían usado zapatos pero que después del Ciclón de 1899 se sintieron enfermos debido á la exposición durante aquél y á las lluvias subsiguientes. Tales personas se vieron entonces en contacto con lodo y agua cenagosa y quedaron infectadas. Todavía mucha de nuestra gente pobre refiere el origen de su enfermedad á aquel año que llevó al siguiente más de 12,000 muertes por anemia.

Nuestros casos 14, 19, 20, etc. de las 61 especiales de Utuado y 1 y 16 de Bayamón (véase apéndice) corroboran lo que dejamos apuntado.

El caso 51, de la serie general, refiere que antes del Ciclón usaba zapatos y nunca padeció de anemia. Los casos 400, 910, y 941 serie general, hacen constar que después de un ataque de mazamorra se sintieron enfermos de "anemia." El caso 482 de la misma serie era un mayordomo de una finca de café, que estuvo bajo nuestro tratamiento. Levantó su hemoglobina á 76% en Julio 8 y durante tres semanas, consecutivos exámenes no revelaron la ova de uncinaria; pero en el transcurso de estas semanas, tuvo un ataque de mazamorra El 1.º de Agosto su hemoglobina había bajado á 58%, habiendo tomado, sin embargo, durante este tiempo dos dosis de timol: como era natural los huevecillos no aparecieron en las heces.

Uno de nuestros casos más interesantes es el 4,431: R. M. 29 años de edad; negro. Estaba al servicio del campamento para vaciar los zambullos de las letrinas, enterrar su contenido, echarles luego cal y colocarlos en su sitio. Trabajó diez y seis días, al cabo de los cuales vino á nosotros solicitando remedio y diciéndonos que aunque él necesitaba trabajar no podía hacerlo porque se sentía muy débil, con dolores lacinantes de estómago y que estaba "comido" de mazamorra. Refiere que la gastralgia sobrevino al octavo día después que su dermatitis empezó y explica que su enfermedad *le ha subido de los pies al estómago*. Nos informó de ataques de mazamorra años ántes, pero que nunca había estado enfermo. Se encontraron muchos huevos en sus heces y la tasa de su hemoglobina era 15%. La relativa inmunidad de raza no fué en este caso bastante á resistir la intensa infección.

El último caso que citaremos es el de un soldado del Regimiento de Puerto Rico de estación en San Juan, que fué admitido en el Hospital con marcada mazamorra adquirida trabajando descalzo en la limpieza de unos fosos, cerca del castillo del Morro. Solicitamos permiso del Cirujano, Comandante Lippitt, para estudiar el caso y enviamos al soldado á que nos trajera un poco de tierra del sitio donde él dijo había contraido su dermatitis. Las muestras reconocidas nos mostraron abundantes larvas de uncinaria.

De los 947 casos de Bayamón, 284 fueron preguntados si habían sufrido mazamorra: 263 contestaron afirmativamente; 21 no dieron historia de ataque alguno. A la mayor parte de los de Utuado se les interrogó de igual modo. De nuestros 61 casos especiales uno dió una dudosa historia de la dermatitis, los otros claras y afirmativas. De los 4,482 casos de la serie general, solo 86 dejaron de ser interrogados y 65 aseguraron que no la habían tenido.

La mayoría de ellos refieren, que son víctimas de la mazamorra en cada cosecha de café, y muchos, que esta los incapacita para el trabajo.

Resumiendo: de los 5,490 casos de uncinariasis registrados, á 749 no se preguntó si habían ó nó sufrido de mazamorra. De los 4,741 interrogados contestaron afirmativamente 4,654, lo que dá un término medio de 98%.

CAUSAS PREDISPONENTES.

Como causas de "Anemia" en los trópicos, registra el pasado una larga lista de influencias y condiciones invocadas para explicarla. Tema ha sido este que llegó á la Patología, haciendo de un síntoma una enfermedad y causas sobre causas se amontonaron en su etiología. Aquí en Puerto Rico y en otros países tropicales, esa profunda Anemia que corresponde á una entidad morbosa definida, no tuvo otra causa, hasta que fué hallada la uncinaria, que aquellas que de modo idéntico pueden concurrir en otros procesos. Sin embargo, esas influencias hay que contarlas aquí como se cuentan en todos los padecimientos, pues si á nadie se le ocurre que exista una tuberculosis sin bacilo tuberculoso, á nadie se escapa tampoco que un tísico mal alimentado, recluido en insalubre vivienda y en clima impropio será más pronto víctima de su infección.

Tal ocurre con la Anemia que estudiamos. Si hay un factor parasitario que la engendra, hay causas también que concurren á agravarla; pero estas causas no pueden figurar más que como secundarias, sin que de modo alguno deban estimarse dentro de la misma categoría que la principal.

Veámos cuales son estas causas:

Régimen alimenticio. Alimentación insuficiente ha sido sinónimo de Anemia y para la mayoría, causa principal de la que se padece en esta Isla, al punto de no atribuirla hasta fecha reciente, á otros factores. Mas, la cuestión esencial aquí, es ¿ falta el elemento proteico en la dieta del campesino puertorriqueño, en tal grado, que afecte su conservación? Claro es, que los proteidos solos, son insuficientes y que se necesitan en un régimen completo los hidratos de carbono y las grasas. Pero veamos á éste respecto, lo que dice G. Thompson en su "Food and Dietetics" que el esquimal que necesita comer enormes cantidades de grasa para resistir los intensos fríos y las grandes jornadas, no es tan fuerte como el negro del Africa Central, cuya alimentación es vegetal, y alguna vez asociada de pescado ó gamo. Ambos, sin embargo, encuentran los proteidos é hidratos de carbono en su régimen; uno los deriva del reino vegetal, otro del animal. El guerrero de la Polinesia es más feroz con su dieta de plátanos, que el esquimal que usa carne, pescado, y grasas. El japonés se alimenta esencialmente de arroz y encuentra en él una fuente de principios nitrogenados. "Los mejicanos utilizan poco la carne, y preparan su comida habitual á base de habichuelas ó frijoles y distintos vegetales, haciendo un estofado con verduras y tasajo". (M. A. Abel). Lo mismo puede decirse de muchas partes de la América del Sur.

Hutchinson, dice:

"Los alimentos vegetales no solo son abundantes en hidratos de carbono, sino que contienen proteidos y grasas tambin. Algunos miembros de esta clase, como los guisantes, son ricos en los primeros elementos: las nueces en los segundos, pudiéndose decir, que los alimentos vegetales más que los otros, tienen mayor representación de los tres grupos de sustancias nutritivas. En consideración á este hecho, el reino vegetal debe ser estimado como la mejor fuente del alimento humano, y si uno fuera obligado á elegir una dieta exclusiva de uno ú otro reino, sería más sábio el que patrocinara al molinero y al vendedor de verduras, que aquel que se decidiera por el carnicero ó el vendedor de pescado, pues indudablemente es posibe vivir con una dieta vegetal, y muy difícil resistir por largo tiempo una á base exclusiva de carne. Por lo demás, la mayoría, toma de ambas fuentes su alimento.

El régimen dietético del jíbaro de Puerto Rico comprende guineos, plátanos, varias tuberosas de valor aproximado á la patata, guisantes, arroz, y habichuelas.

El puede cultivar el maiz aunque conoce poco de su preparación para usarlo como alimento; utiliza el bacalao que es barato aunque muchos no pueden comprarlo, y otras sustancias más generalmente conocidas, entran en su alimentación. En Utuado, uno de los distritos más pobres de la Isla, nosotros anotamos los primeros doscientos casos, haciendo constar la presencia ó ausencia de fibras de carne en el exámen microscópico. En 83 fueron encontradas. De estas 83 personas, 60 estaban profundamente anémicas, 15 en grado mediano y 8 ligeramente ó no lo estaban.

En tanto el alimento vegetal no falte en el interior y pueda asegurarse en cantidad suficiente, el sostenimiento de la vida se realiza. Con raras excepciones, los casos de inanición vienen cuando la uncinariasis imposibilita á los enfermos para todo trabajo y la alimentación escasa, agravando el cuadro morboso, lleva al organismo á un término fatal.

Aunque no es nuestro propósito hacer un estudio del poder alimenticio de los vegetales de la Isla deseamos llamar la atención hacia varios de los artículos no estimados, acaso por suponerse de poco valor nutritivo.

Variedades de guineos y plátanos.

Tabla 3.—

	Harina de plátano.	Harina de trigo.
Agua	13.	13.8
Proteidos	4.	7.9
Grasa	0.5	1.4
Hidratos de Carbono	80.	76.4
Sustancias minerales	2.5	0.5

(Hutchinson.)

Knight cita á M. Humboldt que indica, que para obtener 33 libras de trigo y 99 libras de patatas, se requiere el mismo espacio que para lograr 4,000 libras de plátanos, y refiere cómo un pequeño espacio cultivado al rededor de una choza, mantiene una numerosa familia de indios.

Hutchinson dice: "Es evidente que nosotros poseemos en el plátano una fuente potencial de alimento barato, que puede algún día ser de gran importancia."

Parke ("Mi personal experiencia en el Africa Equatorial" pag. 416) en el relato de la Expedición de Socorro de Emin Pasha, refiriéndose á Stanley que sufría á la vez de gastritis aguda, dice lo siguiente: "El come una sopa hecha con harina de plátano y leche. Esto es muy ligero y digestible * * * y es tambien muy nutritivo. Nosotros los europeos, podemos apreciar este hecho porque generalmente nos hemos alimentado de harina de plátano durante los dos años pasados". Largas marchas y frecuentes ataques de fiebre malárica que sufrieron pueden atestiguar el poder nutritivo de esta dieta.

La harina de plátano puede ser facilmente preparada y es superior á cualquier otra preparación del fruto. No hemos dedicado especial atención al diferente valor nutritivo de las distintas clases de plátanos pero ésto no afecta en nada á nuestras conclusiones. Por lo que á los granos toca, como guisantes, habichuelas, etc., demás está decir su alto poder proteico. Solo mencionaremos la famosa "ración de hierro" de los alemanes en la guerra franco-prusiana, para evidenciar la estima en que se tiene al proteico vegetal. "Erbswurst" como se le llamaba, es una mezcla de guisantes, sal y grasa, y esta es con alguna modificación la ración militar de emergencia.

El Maiz, muy apreciado en el Sur de los Estados Unidos, constituye la dieta de muchas personas pobres y es un cereal que contiene 9% de sustancias grasas, que nuestro campesino no aprovecha.

Los agüacates proporcionan tambien grandes cantidades de estas sustancias.

El azúcar de caña no falta nunca y es, como sabemos, un poderoso productor de energía.

En resumen, la dieta del labriego de este pais es generalmente pobre, y muchas veces causa de su deficiente nutrición. Pero entre un régimen alimenticio defectuoso y la inaniciacion hay una gran diferencia. En el primero hay falta de uno ó más de los *elementos* proteicos, hidrocarburos, grasas, y sales; en la segunda hay falta de *alimento* (miseria social, independiente del acarreo alimenticio en las enfermedades). La inaniciación, amenazaba el año 1899 despues del huracan que devastó la Isla, en cuya época los esfuerzos del ejército de los Estados Unidos cooperaron á impedirla. Pero la iniciación se traduce por síntomas generales claros, precisos, con enflaquecimiento, fusión del tejido adiposo, por un cuadro en fin que no encontramos en el enfermo anémico de nuestros campos. Antes de ocurrir la muerte por inaniciación, el cuerpo pierde el 90% de su grasa y sin embargo la sangre tiene aumentados sus glóbulos rojos y su tasa de hemoglobina. Hayem registra dos casos de genuina insuficiencia alimenticia uno con 12,000,000 de hematíes por m.m.c. y 120% de hemoglobina, y otro con 8,780,000 de glóbulos rojos. Compárense los casos por nosotros estudiados con estas cifras.

Las objeciones á una dieta vegetal son:

Su volúmen; pues para obtener el suficiente montante de proteicos hay que consumir 3,500 gr. diariamente, lo que obliga á aumentar la capacidad de los órganos digestivos originándose á la postre los trastornos conocidos.

Su incompleta asimilacion; pues los jugos gástricos é intestinales actuan con dificultad sobre la masa, y es un hecho establecido que los proteicos vegetales son de 20 á 40% ménos asimilables.

La cubierta de las células vegetales, compuesta exclusivamente de celulosa que les hace á menudo poco digestibles, amén de su paso íntegro á través del canal en ocasiones.

Que un régimen vegeteriano no es una fuente de energía nerviosa, aunque es una fuente de fuerza muscular, como se evidencia en la desarrollada en un dia de trabajo. Sin embargo, esta falta de poder á generar tal energía, baja también el de las resistencias á las enfermedades. De ahí la aparente facilidad con que muchos pueblos vegetarianos son presas de epidemias.

Pero en términos generales "el labriego sujeto á un régimen vegetal emprende faenas de importancia y hace una nutrición perfecta; y no se diga que los aires del campo ó la conducta sencilla que observa explica esto bien en manera alguna; lo que no tiene es un cerebro avariento que le pide ázoe, sino una médula trabajadora que le exige carbono." (Alcina).

Esto no quiere decir, por lo que á éste pais respecta, que su régimen alimenticio sea tan completo que no necesite ser modificado. Harto sabemos, además, que sobre todo en ciertas partes de la Isla, la crisis de intereses industriales priva al jíbaro de los elementos proteicos, y es posible que un cierto grado de anemia se origine por la carencia de tales principios. Y claro es que nosotros, de acuerdo con las autoridades citadas, creamos que la dieta del labriego de Puerto Rico influye en el pronóstico de una enfermedad que empobrece la sangre, impidiendo generar las energías para resistir la toxina hemolítica.

Procedamos á pasar una ligera revista sobre nuestras observaciones clínicas, y el resultado de nuestro trabajo.

De 947 casos tratados en Bayamón, un interrogatorio, acerca del régimen alimenticio se hizo en 355. De estos, 225 contestaron usar el alimento ordinario del país; arroz, habichuelas, vegetales y algunas veces bacalao, sin que les faltara en cantidad. Noventa dijeron, que hacían una comida mixta. Cuarenta, que su alimentación era deficiente en cantidad y calidad. De las 225 personas, cuyo alimento fué el usual del país, á 217 se les apreció la hemoglobina, con el resultado siguiente:

Tabla 4.—

Menos de 20%	14	personas.
Entre 20 y 29%	37	"
" 30 " 39%	50	"
" 40 " 49%	47	"
" 50 " 59%	30	"
" 60 " 69%	21	"
" 70 " 79%	11	"
" 80 " 89%	5	"
" 90 " 100%	2	"
Total	217	

Término medio de la hemoglobina en esta clase 43+.

De las 90, que usaron una dieta mixta, fué tomada la tasa de hemoglobina á 86, dando la siguiente proporción:

Tabla 5.—

Menos de 20%	2	personas.
Entre 20 y 29%	17	"
" 30 " 39%	21	"
" 40 " 49%	20	"
" 50 " 59%	11	"
" 60 " 69%	8	"
" 70 " 79%	5	"
" 80 " 89%	1	persona.
" 90 " 100%	1	"
	86	

Término medio de hemoglobina en esta clase, 43.5. La nota "la mejor clase de alimento" fué encontrada en 2 casos, uno con 93% Hb. y otro con 24%.

En los 40 individuos, cuya alimentación fué puramente vegetal y restringida, el exámen cromométrico dió:

Tabla 6.—

Menos de 20%	1	persona.
Entre 20 y 29%	10	personas.
" 30 " 39%	7	"
" 40 " 49%	8	"
" 50 " 59%	5	"
" 60 " 69%	3	"
" 70 " 79%	4	"
" 80 " 90%	2	"
	40	

Término medio de la hemoglobina en este grupo 44+.

En nuestras notas encontramos, refiriéndonos á estos 40 casos: "en dos casos de Toa Alta, que usaban el más pobre alimento, uno tuvo 95%

de Hb. y el otro 28%". El primero tenía muy pocos huevos de uncinaria; el segundo, muchos. Repetidas veces hemos observado individuos de una misma familia, que tenían idéntico régimen alimenticio, con marcada Anemia unos, en tanto que otros estaban rosados y saludables: los unos sumamente pálidos sufren una intensa infección, los otros ó no estaban infectados ó lo estaban poco.

Como ejemplo de la influencia del alimento en la "anemia" de esta Isla, véase el caso 2, serie de Utuado (Apéndice), en el cual la expulsión de sus parásitos fué seguida de un alza de su hemoglobina desde 38 á 100% en el espacio de seis semanas, sin que este sujeto hubiese estado en el Hospital, ni recibiera otra alimentación que la pobre que podía proporcionarse en su casa. El caso 7, de la misma serie, deja el Hospital despues de haber necesitado seis semanas para elevar su *tasa* de 10 á 64%. Despues de dos semanas de estar en su casa, bajo el régimen alimenticio ordinario, su hemoglobina subió de 64 á 103%. Los casos 8, 11, 15, y 47 son similares. El 19 muestra profunda anemia estando bien alimentado en Ponce, y es anémico también en Utuado con un régimen deficiente. Por otra parte los casos 20, 58 de Utuado, y el 1, y especialmente el 16 de la serie de Bayamón, demuestran cómo la mejor clase de alimentación no previene la anemia de uncinariasis.

Clima: No es Puerto Rico responsable por su clima de las profundas anemias aquí sufridas. Una isla bañada constantemente por las brisas, con temperatura media mensual de 23.3° C. en Enero, y 27.5° C. en Agosto y una media anual de 22° C. en las montañas, allí donde precisamente cunde la anemia, no es este calor bastante á producirla. Podrá ser factor, digno de tenerse en cuenta en el desarrollo de muchos parásitos como el que motiva la epidemia que estudiamos, y para el de otros como el stegomia fasciata "mosquito de la fiebre amarilla;" pero no agente que influya originando tan graves manifestaciones de empobrecimiento sanguíneo.

Humedad y lluvias: El medio por 100 de humedad aquí es 80, que es desde luego elevado. La precipitación anual varía considerablemente. En San Juan es de 60 pulgadas, en el N. E. de 100 pulgadas ó más. En general las lluvias son, en Puerto Rico, abundantes. Precisamente en lo que aquí puede llamarse época de lluvias se verifica la cosecha de café, siendo de notar cómo aumenta después de ella la cifra de mortalidad, porque en el lodo y en el fango se desarrollan entonces los huevos del parásito y la infección tiene lugar. La humedad es condición general que influye en el desarrollo de muchas enfermedades; pero la concurrencia de ella, en aquellas fincas donde el cultivo ó recolección se verifica bajo la sombra, favorece al terreno que mantiene las larvas.

Distribución Geográfica en Puerto Rico: Los miembros de la Comisión han tenido oportunidad de estudiar la enfermedad en casi toda la Isla. De aquellos pueblos no visitados, nos han remitido datos otros compañeros.

La siguiente tabla, indica el número de individuos según las distintas municipalidades y barrios que se presentaron en nuestra clínica de Bayamón.

Tabla 7.—

Bayamon, pueblo	152	*Aguas Buenas*, pueblo	1
Barrio, Nuevo	137	Barrio, Juan Asencio	5
“ Juan Sanchez	15	“ Mulas	2
“ Hato Tejas	28	*Comerío*, pueblo	2
“ Dajaos	38	Barrio, Rio Hondo	1
“ Cerro Gordo	41	“ Doña Elena	2
“ Minillas Abajo	26	*Corozal*, pueblo	1
“ “ Arriba	32	Barrio, Negros	1
“ Güaragüao Abajo	37	*Rio Piedras*, pueblo	12
“ “ Arriba	34	*Caguas*, “	1
“ Camarones	3	*Ciales*, “	2
“ Santa Olalla	60	*Toa Baja*, pueblo	4
“ Buena Vista	45	Barrio, Candelaria	9
“ Santa Rosa	19	*Toa Alta*, pueblo	21
“ Pájaros	16	Barrio, Piñas	5
“ Sonadora	10	“ Mucarabones	13
“ Gutiérrez	3	“ Galateo	5
“ Pueblo Viejo	3	“ Contorno	4
“ Guaynabo	7	“ Rio Lajas	3
“ Palo Seco	1	“ Ortiz	3
“ Palmas	1	“ Quebrada Arenas	5
Cataño	11	*Vega Baja*, pueblo	2
Naranjito, pueblo	75	Barrio, Mavilla	1
Barrio, Achiote	10	*Barros*, pueblo	1
“ Cedro Abajo	2	*Morovis*, “	1
“ “ Arriba	2	*Manatí*, “	1
“ Nuevo	5	*Dorado*, “	1
“ Anones	5	*Guayama*, “	1
“ Lomas	1	*Ciudad de San Juan*	18

La relación siguiente es la de los que concurrieron de la Ciudad de Utuado, sus barrios y de otros pueblos.

Barrio, Angeles * y ‡	162	Barrio, Paso Palma †	137
“ Arenas †	251	“ Rio Abajo ₰	345
“ Caguana ‡	357	“ Rio Arriba	29
“ Caniaco §	184	“ Roncador *	171
“ Caonillas †	183	“ Sabana Grande †	280
“ Concejo	40	“ Salto Abajo †	161
“ Don Alonso § y ¶	336	“ Salto Arriba	208
“ Guaonico	173	“ Santa Isabel *	58
“ Jayuya (parte †)	197	“ Santa Rosa *	66
“ Limon § y ¶	167	“ Tetuán	99
“ Mameyes ‡	198	“ Viví Abajo †	128
“ Palmas †	11	“ Viví Arriba †	98

Ciudad de Utuado 277

NOTA: Somos deudores al Sr. Le Grand, de Utuado, del análisis siguiente de las tierras de varios barrios.

* Arcillosas calcáreas,	§ Arcillo-ferruginosas.
† Arcillo-arenosas.	¶ Arcillosas compuestas.
‡ Arcillo-gredosas.	₰ Arcillosas humíferas x ferrs. x calcáreas.

Arecibo	62	Hatillo	2	Manatí	1
Adjuntas	85	Ciales	5	Desconocida	2
Camuy	3	Lares	6		

La residencia en nuestras casos especiales, va anotada en cada historia.

Clase social afectada y ocupaciones. El ochenta y cinco por ciento de los 953,243 habitantes de la Isla, está considerado como clase pobre y el 75% está dedicado á la agricultura. El término medio de las personas que viven en los pueblos de más de 8,000 habitantes es 8.7%, y corresponden 300 personas por milla cuadrada. La uncinariasis es una enfermedad del pobre, que es el que está más expuesto á la infección. Por eso la pobreza es considerada como causa de anemia, porque es realmente, una condición predisponente. No creemos necesario mencionar más que algunas ocupaciones de las clases jornaleras que favorecen la infección.

1. *Cultivo de café.* Los trabajadores en la fincas de café son los más expuestos de toda la Isla. Además de que junto á sus casas tienen la fuente de infección, en los cafetales, las larvas de uncinaria están muy esparcidas. Este trabajador que vá de ordinario descalzo, labra su subsistencia en aquellos parajes, precisamente cuando las condiciones de humedad son más propicias para el desarrollo de los embriones infectantes. Raro fué el caso de Utuado que no nos dijera que en "las cosechas de café" adquiría su mazamorra.

2. *Ladrilleros.* Aquí como en Europa ésta es una de las ocupaciones que ofrece oportunidades para la infección.

3. *Haciendas de caña.* El jornalero no se infecta en ellas con tanta facilidad, por las razones apuntadas; pero es frecuente en aquellos sitios húmedos, debido al riego.

4. *Los baños* en la orilla de las quebradas producen muchas veces mazamorra. Son sitios que están generalmente infestados.

5. *Platanales.* Son lugares predilectos para la pululación de las larvas y en ellos se adquieren con mucha frecuencia intensas infecciones.

6. *Jardines.* No es necesario hacer notar la posibilidad de una infección tratándose de tierra infestadas.

Hábitos. La uncinariasis es una enfermedad provocada por hábitos sucios, pues el solo medio de infestar el suelo es depositando en él las deyecciones. Si el uso de letrinas se generalizase, la enfermedad se restringiría hasta llegar á desaparecer.

Pero desgraciadamente estas elementales medidas de higiene, no se observan. Por regla general, todos nuestros casos de Utuado referían que ellos depositaban sus heces en campo abierto. Nuestros 61 casos especiales, 55 manifestaron no tener letrinas en sus casas, 6 que las tenían, pero de estos solo 2 vivían en el campo, los otros en el pueblo. En Bayamón 342 personas fueron interrogadas acerca de este particular y solo 53 depositaban sus excrementos en sitio adecuado, los 289 restantes nó.

Por esto, como en otro sitio referimos, las infecciones se suceden. Y sobre una crónica uncinariasis, nuevas invasiones desarrollan síntomas agudos sin que el individuo se vea nunca libre de sus parásitos. Estos, por ley natural, tienen un término de vida, y no reproduciéndose en el organismo de su huésped, claro es que, llegarían á extinguirse.

Tal fenómeno de extinción espontánea de los vermes es la "cura natural" que se observa en aquellos individuos que abandonan el campo y viven en San Juan ó en otros pueblos y ciudades de la Isla, lo que ha dado motivo á robustecer más la creencia de que la alimentación sea causa principal de la anemia. Esas personas vienen infectadas, pero no vuelven á infectarse más, porque en las casas donde viven y en los sitios donde realizan su trabajo no hay mazamorra.

El siguiente estudio practicado en las niñas acogidas en el "Asilo Cristiano de Huérfanas" de Bayamón, aclarará más este punto.

Estas niñas, llegaron al Colegio con distintos grados de Anemia, indudablemente debido á uncinariasis. La Directora del Asilo nos dijo, que 31 de ellas ingresaron muy pálidas, algunas en grado extremo, y que después de algunos meses, empezaron á mejorar, hasta que al cabo de dos ó tres años, toda Anemia había desaparecido. Cuatro estuvieron en la institución menos de dos años; cinco entre dos y tres; treinta y cinco más de tres; y una, cuyo tiempo de residencia no anotamos. Como se puede observar en la tabla, su medio por ciento de hemoglobina es 82+; el de las que no tienen huevos de uncinaria 82.8+, y el de las que los mostraron 82+. Algunas de estas están todavía un poco pálidas. Treinta y ocho de las asiladas tuvieron ova en sus heces, y siete no. Fué muy difícil encontrar los huevecillos y algunas veces se necesitaron varias preparaciones, para hallar en general, pocos. Estas niñas, están ahora calzadas, se alimentan bien, tienen buenos hábitos de limpieza, y aseo, y no se les ofrece ocasión de infectarse.

Incluimos en la columna Geofagia aquellas acogidas de quienes se nos dijo tenían esta perversión del apetito, estimándolo como medio posible de infección en nuestro campesino; pero tales niñas no comían precisamente tierra, sino otras sustancias bajo ese nombre consideradas. Diez y seis de las 45 niñas tenían este hábito.

Suponiendo, que todas las asiladas al ingresar vinieran infectadas, y comprobado que ahora lo están en escaso número, deducirémos:

1. Que muchas uncinarias fueron gradualmente muriendo, y que si entraron nuevas, fué en escaso número.

2. Que, bajo un régimen apropiado, la relativa inmunidad individual se restableció en aquellas que la habían perdido.

He aquí el cuadro á que antes nos referimos:

Tabla 8.—

Caso.	Residencia anterior.	Ova de unciaria.	Por cent Hb.	Años en la institución.	Palidez al ingreso.	Geofagía.
601	San Juan	si	85	mas de 3	si	si
602	Bayamón	si	50	1 año, 4 mes.	si	si
603	Rio Piedras	si	62	3	si	si
604	Caguas	si	70	2	si	si
605	Rio Piedras	si	85	3	no	si
606	San Juan	no	80	4	no	no
607	San Juan	no	86	4	si, mucha	no
608	San Juan	no	87	3	no	no
609	Cataño	si	110	1 año, 3 mes.	no	no
610	Bayamón	si	76	mas de 3	si, mucha	si
611	Bayamón	si	62	mas de 3	si	si
612	Rio Piedras	si	94	2½	no	si
613	Bayamón	si	91	3	no	no
614	Rio Piedras	si	64	4	si	si
615	Cataño	si	101	3	si	no
616	San Juan	si	67	3½	si	si
617	San Juan	no	93	9 meses	si, mucha	no
618	San Juan	si	83	2	si	no
619	Bayamón	si	82	3	no	no
621	Bayamón	si	75	3	si, mucha	no
622	Corozal	si	110	mas de 3	si, ligera	no
623	Rio Piedras	si	45	mas de 3	si	si
624	Rio Piedras	si	60	2½	si	no
625	Rio Piedras	no	66	3	no	no
626	Bayamón	si	104	4	si	no
627	San Juan	si	94	4	si	no
628	Guayama	si	88	3	no	no
629	Rio Piedras	si	94	mas de 3	no	no
630	Cataño	no	90	mas de 3	no	no
631	Bayamón	si	85	3	si	si
632	San Juan	si	85	3½	no	si
633	San Juan	si	74	9 meses	si	no
634	Rio Piedras	si	74	3	si	si
635	Bayamón	si	87	4	si	no
636	Bayamón	si	75	mas de 3	si	si
637	Bayamón	si	73	mas de 3	si	no
638	Dorado	si	78	mas de 3	si	no
639	San Juan	si	76	4	si	no
640	Guayama	si	76	2	no	no
641	Guayama	si	95	—	—	—
642	Bayamón	si	93	mas de 3	si	no
643	Bayamón	si	79	mas de 3	si	si
644	San Juan	si	120	3½	si	no
645	San Juan	no	78	4	si	no
646	Cataño	si	94	mas de 3	si	no

Otros hábitos contribuyen á que se adquiera esta dolencia, como el andar descalzo, que abre la puerta á la infección, etc. El abuso de las bebidas alcohólicas no tiene, en este padecimiento, efecto más deplorable que en otros.

Hemos registrado casos muy curiosos de infección. Un prominente americano, hombre de escrupulosos hábitos y en quien la infección no pudo ser de modo alguno por la boca, contrajo ligera mazamorra en una ocasión en que se quitó las botas para pasar un charco, indudablemente infestado. Algunos meses después la ova de uncinaria fué encontrada en sus heces. Él nos informó que otro continental, igualmente afectado, había sido enviado á su casa sufriendo de profunda anemia que se atribuyó á caquexia palúdica. La descripción que nos hizo de ese caso, nos lleva á pensar que, probablemente, aquellos síntomas correspondían además á la uncinariasis.

Edad: Las edades de nuestros pacientes fueron clasificadas en grupos de cinco en cinco años como sigue.

Tabla 9.—

Edad.	Bayamón.	Utuado.	Casos especiales.	Total.
Menos de 5	11	24	0	35
Entre 5 y 9	99	427	5	531
" 10 y 14	122	887	18	1,027
" 15 y 19	114	636	9	759
" 20 y 24	131	501	9	641
" 25 y 29	142	564	5	711
" 30 y 34	67	424	6	497
" 35 y 39	72	326	7	405
" 40 y 44	44	219	1	264
" 45 y 49	43	145	1	189
" 50 y 54	31	164	0	195
" 55 y 59	30	65	0	95
" 60 y 64	7	61	0	68
" 65 y 69	13	17	0	30
" 70 y 74	2	8	0	10
" 75 y 79	2	5	0	7
" 80 y 84	0	3	0	3
" 85 y 89	0	1	0	1
Edad no datada	17	5	0	22
Total..........	947	4,482	61	5,490

La primera década comprende 566 personas; la segunda, 1,786; la tercera, 1,352; la cuarta, 902; la quinta, 453; la sexta, 290; la séptima 98; la octava, 17; la novena, 4.

El 92+% fué de de ménos de 50 años de edad y el 62+% de éstos entre 10 y 30.

Interpretando estas cifras llamamos la atención hacia la advertencia hecha en un estudio previo de esta enfermedad en la Isla (A Study of Uncinariasis in Porto Rico, Am. Med., Vol. 6, No. 10 y 11) "Es un hecho significativo que mientras en Puerto Rico hay una gran diferencia á favor de los niños, mayor que en ningún Estado excepto Carolina del Sur en 1890, el término medio de personas de mas de 60 años fué menor que el 40 por 1,000 comparado con el 62 por 1,000 en los Estados Unidos." Nosotros creemos que, aparte de esto, la enfermedad es mas destructiva en los jóvenes y sobre todo, los de 10 á 30 años dan el mayor contingente como puede observarse en la tabla anterior. Una relativa inmunidad logran aquellos que han sufrido las consecuencias de una infección y han podido vencer sus perniciosos efectos. Personas de todas las edades pueden sin embargo ser infectadas si ofrecen oportunidad á la entrada de las larvas.

Sexo: De nuestros 5,490 pacientes 3,259 fueron hombres y 2,231 mujeres ó sea un 40.6+%. Esta diferencia en favor de los hombres es debida á las más frecuentes ocasiones de infección que tienen aquellos. El grado de anemia varía, siendo menor en las mujeres que en los hombres debido tal vez, en términos generales, al número de parásitos en uno y otro sexo, por consecuencia de las sucesivas reinfecciones de que es objeto más frecuentemente el hombre. En Bayamón de las 577 personas cuya tasa de hemoglobina fué apreciada, excluyendo las niñas del Asilo, 165 mujeres dieron un medio de 48+%, y 412 hombres, 41+%.

Tabla 10.—

SEXO COMPARADO CON HEMOGLOBINA	FEMENINO	MASCULINO
Entre 10 y 19% Hb.	7	24
" 20 " 29% "	26	86
" 30 " 39% "	30	97
" 40 " 49% "	21	97
" 50 " 59% "	29	43
" 60 " 69% "	24	34
" 70 " 79% "	20	17
" 80 " 89% "	6	9
" 90 " 99% "	1	5
Mas de 100% Hb.	1	0
Total	165	412

Solo tres de los 400 casos de Sandwith fueron mujeres, debido dice él á la costumbre oriental que mantiene recluida á la mujer.

Raza é inmunidad. Por las dificultades de separación hemos de proceder á considerarlas juntas.

El sesenta por ciento de la población de la Isla se dice que corresponde á la raza blanca. La negra posee un alto grado de inmunidad sobre el blanco, pero no absoluta en las Américas. Jacoby y Zinn creen en la inmunidad del negro. La peligrosa presencia del parásito fué primeramente demostrada en Egipto, pero no está completa la historia de la uncinariasis, mientras no se sume á los estragos que hace allí el padecimiento, la inmunidad de que gozan las tribus aborígenes del Congo, y otras partes de Africa, donde existe la infección, sin acusar síntomas.

Nosotros tuvimos la fortuna de recibir una información directa de la sección de Africa menos explorada que nos suministró Mr. F. Stevenson, misionero por algunos años en Africa Central, actualmente en Utuado. Él tuvo ocasion de usar medicamentos en su trabajo en Africa y fué atraido por nuestro campamento durante nuestra permanencia allí. Díjonos que el alimento de aquéllas tribus era esencialmente vegetal; que eran hombres de estatura gigantesca y de un perfecto desarrollo físico, pero que padecían de graves dermatitis en tiempo de lluvias, que ellos atribuían á venenos puestos en tierra por sus enemigos. Nos refirió que estas irritaciones terminaban por úlceras muy graves á veces, pero que no tenía noticias de la enfermedad allí, aunque la dermatitis le era conocida.

Para comparar el grado de anemia, según la raza, hemos preparado el cuadro siguiente observando 540 personas:

Tabla 11.—

RAZA COMPARADA CON HEMOGLOBINA	BLANCOS.	MULATOS.	NEGROS.
Menos de 20% Hb.	20	8	1
Entre 20 y 29% Hb.	83	23	1
" 30 " 39% "	88	31	4
" 40 " 49% "	82	26	9
" 50 " 59% "	43	26	2
" 60 " 69% "	39	16	2
" 70 " 79% "	10	11	2
" 80 " 89% "	6	5	1
" 90 " 99% "	. .	. .	. .
" 100 " 110% "	. .	. .	1
Total.	371	146	23

Los datos anteriores dan un 45 + % Hb. para los blancos, 44 + % para os mulatos, y 49 + % para los negros. Es importante notar que muy pocos negros vinieron á nuestro consultorio, pues Bayamón, de donde son esos 540 casos, es una municipalidad en la que viven muchos. Nosotros creemos que en ellos existe un grado de inmunidad mayor para la toxina que en el blanco, pero que despues de algunas generaciones se pierde ó disminuye con el cruzamiento de raza.

Que esta inmunidad no es absoluta, lo demuestra el caso 4, 431 citado antes, creyendo nosotros además que en este pais la inmunidad de raza no dura tanto ni es tal que impida los efectos de una infección intensa.

Leichtenstern en 1899, refiere que las viejas razas de Asia son relativamente inmunes á la toxina pero son portadoras de parásitos. En el Indostan encuentra Dobson el 75.58% de los jornaleros saludables infectados; mientras Thornhill registra gran número de muertes debido á la enfermedad y añade que en Ceilan la uncinariasis es más fatal que el cólera. Macdonald comunica haber tratado 1,760 casos con 395 muertes. Uno de los escritores tuvo un caso de un soldado con uncinariasis que había sido infectado en las Filipinas, quien refirió que cerca de 20 hombres de su compañia presentaban los mismos síntomas que él, añadiendo que los nativos son muy saludables. Que la enfermedad existe en aquella isla se sabe por los informes de los médicos del ejército; pero también se sospecha que hay allí una inmunidad de raza.

Los negros y tal vez los malayos y mongoles son relativamente inmunes á esta enfermedad, aun cuando llevan el parásito; por mas que no sepamos el número de estos vermes que usualmente portan. Sin embargo, esto no tiene nada de extraño cuando es sabido que existe relativa inmunidad para la fiebre amarilla, especialmente en el negro. Nadie niega hoy tampoco que pueda existir el plasmodium de la malaria en la sangre sin producir fenómenos palúdicos, ni que un famoso médico francés encuentre en el 60% de las autopsias que practica, lesiones causadas por el bacilo tuberculoso sin que á este micro-organismo se debiera la muerte.

La literatura y nuestra experiencia personal nos enseñan, que hay casos de infección por uncinaria sin síntomas objetivos de la enfermedad. Muchos de estos, no tienen anemia; pero sufren otras manifestaciones de la-uncinariasis.

La resistencia individual, inherente ó adquirida, es un factor importante como lo es en todas las infecciones. Y las condiciones bajo las cuales se realiza la vida y se soporta la enfermedad, indudablemente que han de tenerse en cuenta. Sin embargo; casos hay en los cuales aun dentro de las mejores condiciones, la enfermedad no desaparece mientras el tratamiento específico no se instituya: por ejemplo; el caso ya citado de Bayamón n° 16 (Apéndice). Claro es que en la curación de este padecimiento es ayuda poderosa un régimen conveniente sobre todo en aquellos casos graves de nuestros campos que requieren con urgencia albergue en hospital.

Boycott y Haldane dicen con respecto á la infección en las minas de Cornwall que cabe una relativa inmunidad después de haber sufrido la infección. "Primeramente los trabajadores aparecieron infectados. Gran número de ellos sufrían al principio de anemia, pero fueron recobrando su salud sin abandonar su trabajo y sin recibir tratamiento. Otros continuaron por largo tiempo enfermos, aun despues de haber dejado el trabajo y en quienes la inmunidad no se estableció ni lograron la salud hasta que fueron tratados por el timol."

En esto ocurre lo que después de un ataque de difteria, que pasado el peligro, todavía quedan bacilus excretando toxinas en una garganta sana.

Nosotros no estamos, sin embargo, conformes con Boycott y Haldane en todo lo que ellos dicen acerca de inmunidad adquirida. Por sus deducciones comprendemos, que no han tratado los casos de reinfecciones que hemos tenido nosotros aquí.

Todos los datos de causas predisponentes son insignificantes comparados con los que se desprenden de un estudio detenido de la enfermedad.

De 4,482 personas tratadas en Utuado (excluyendo nuestros casos especiales) poco mas de 300 recibieron manutención en el campamento, las demás vivieron en sus casas donde siempre habían vivido, en medio de su pobreza y con el mismo régimen alimenticio insuficiente y escaso. De éstas, 2,151 curaron radicalmente, habiendo expulsado sus parásitos y recuperado la normalidad en su sangre comprobada por los instrumentos; 273 no alcanzaron completa curación, pero prácticamente pueden tomarse como curados y 1,495 mejoraron.

Puede á ésto aplicarse lo que dice Stengel acerca de la anemia secundaria: Del efecto de la dieta es difícil juzgar ya que la evidencia de los experimentos, y algunas observaciones hechas en prolongados ayunos han dado distintos resultados. Senator y Luciani encontraron que la sangre de los ayunadores Cetti y Lucci no sufrió lo que era de esperarse, y experimentos en los animales demuestran considerable aumento en el número de corpúsculos en vez de disminución. Cuando la sangre se afecta, es probablemente debido á causas secundarias ó asociadas tales como fiebre, trastornos orgánicos, etc. El uso del alimento pobre, indudablemente influye en la anemia, como se ha observado en los habitantes de una ciudad sitiada y en tiempos de famina. "Los residentes en paises tropicales presentan con alguna frecuencia marcada anemia, á poco de llegar á estos climas, pero en general esta apariencia es engañosa, y ese estado se debe mas á la acción de los vaso-motores que á una modificación de la sangre en sí. *Las actuales anemias de los trópicos dependen de una causa específica definida.*" (Alfred Stengel

M. D. "20th Century Practice of Medicine" V. 7. pp. 312,313. Wm. Wood & Co.) Los caracteres itálicos son puestos por nosotros.

Resumiendo: infecciones intensas desarrollan un cuadro de síntomas graves en general, salvo la influencia de cierta inmunidad de raza: ligeras infecciones pueden también ocasionar ó nó la enfermedad, según la debilitación ó pérdida de esa inmunidad; y por último, infecciones moderadas producen más frecuentemente la enfermedad, como ocurre de ordinario en Puerto Rico, porque todas las circunstancias que tiendan á debilitar el organismo, disminuyendo sus resistencias naturales y su inmunidad facilitan la acción de la toxina.

Ahora bien; tratar de levantar las resistencias en el labriego de nuestro país y no curar la enfermedad, sería tan ridículo, como ordenar á una brigada de Bomberos que lanzara agua á casas lejanas del sitio del fuego con la esperanza de que eso evitaría la conflagración, sin cuidarse de la casa en llamas.

Alemania se ocupa de combatir la enfermedad por los daños que origina en el presente, y por las responsabilidades del porvenir, dando el más alto ejemplo de previsión y sano juicio al ocuparse de investigar y curar una enfermedad, allí donde de todos los obreros infectados, sólo el 6.87% eran anémicos. Por la misma razón los Estados Unidos y Europa miran en la uncinariasis una enfermedad que hay que combatir á tiempo, antes que sea un azote para los distintos Estados donde se presente.

Puerto Rico ha tomado la iniciativa en los trópicos, inquiriendo la causa de la profunda anemia que á las clases trabajadoras afecta y buscando los medios para su tratamiento y profilaxis. Nosotros hemos encontrado, que el mayor número de estos anémicos lo eran por la infección de uncinaria, y á nuestros compañeros en la profesión recomendamos, muchos de los cuales no necesitan recomendación alguna, que observen como con hierro, quina, y tónicos en general, no se ha podido por largos años, hacer desaparecer la profunda anemia que hace cada día más triste la existencia de nuestro infortunado jíbaro.

PATOGENIA.—ANATOMIA PATOLÓGICA.—HEMATOLOGIA.

PATOGENIA.

Las veces que tuvimos ocasión de observar en nuestros pacientes *la mazamorra* fueron comparativamente pocas con relación al número de uncinariasicos reconocidos, porque nuestro trabajo se llevó á efecto en la estación seca. Más, las lesiones por la mazamorra producidas fueron siempre las mismas, y corresponden á las señaladas por Smith y otros experimentadores. A poco de la infección aparece una pequeña pápula en una línea rojiza de 1 á 4 y muchas veces 6 cm. de largo por 0.25 de ancho. Esta línea marca un canal donde hay alguna exudación serosa. A nosotros no nos ha sido posible encontrar la larva en estas lesiones, primero; porque no podíamos dedicar el tiempo á minuciosas investigaciones y segundo porque cuando á nosotros venían los pacientes con sus dermatitis seguramente ya no estaba el parásito en el sitio de la erosión. Esta pápula pasa á vesícula en uno ó dos días y luego á pústula asociándose ya una infección bacilar. Este fenómeno es acompañado por picor constante, dolor, y sensación de calor que atormentan al paciente noche y día.

La ruta seguida por la larva desde la piel hasta el intestino delgado es todavía problemática. Looss la encuentra en los tejidos de una pierna amputada poco después de la infección. Los recientes estudios de M. F. Schaudinn (Deutsche Med. Woch. Sept. 8 1904) tendentes á probar la hipótesis de Looss, asignan al parásito la via vascular. En monos infectados por la piel y sacrificados luego, Schaudinn encontró la larva en el mesenterio, intestino, pulmones y en las cavidades del corazón, y cree que á través de las venas sub-cutaneas llega al ventrículo derecho de aquí á los pulmones, luego á los bronquios, tráquea, laringe, y esófago para pasar al estómago y terminar en el intestino delgado donde ultíma su desarrollo. Como los síntomas digestivos que el enfermo acusa, datan de 8 días á 2 semanas después de la infección pudiera haber relación con esta marcha de la larva más ó menos rápidamente á través de los tejidos. No obstante las investigaciones en este asunto necesitan más ampliación para marcar de modo concluyente la via exacta. Nosotros nos inclinamos con Grassi, Leuckhart, y otros á la hipótesis de un enquistamiento en la sub-mucosa del intestino donde probablemente la larva se desarrolla. Esta protección que busca el pequeño verme en los repliegues de la mucosa, y á veces en el mismo moco intestinal, hace que los anti-helminticos no actuen sobre él como nos ocurrió con el caso especial núm. 58 de la serie de Utuado (véase Apéndice); lo que suma pruebas á la teoría de Grassi. Algunas veces, hemos visto aparecer un gran número de huevecillos al cabo de dos semanas ó dos meses, de haber creido expulsados todos los parásitos, en cuyo tiempo se habia administrado con regularidad el timol. Estos hechos pueden atribuirse á suspensión de ovulación de los vermes ó, como algunas historias clínicas refieren, á recientes ataques de mazamorra. Las experiencias de Looss, en sus perros infectados, son altamente interesantes.

Cualquiera que sea la situación adoptada por la uncinaria hasta alcanzar su madurez sexual, el hecho es que de 5 á 6 semanas después de la infección por la boca, es que los huevecillos se encuentran en las heces, y tal vez transcurra un período más largo después de la infección por la piel.

El sitio habitual del parásito es el yeyuno, aunque nosotros lo hemos encontrado también en el estómago, duodeno, é íleo.

Siempre se ha considerado á este gusano, chupador de sangre como los hirudos, y sosteniéndose de la asimilación del plasma; mas no de los glóbulos rojos. Se le ha encontrado con la cabeza hundida en la mucosa, y la cápsula bucal tan fuertemente adherida á la pared del intestino que ha costado gran trabajo desprenderle de ella. Muchos escritores han expuesto su opinión de que el total de sangre extraida por el nematodo, no es bastante á producir tan graves anémias como las que causa. Nosotros pensamos de igual manera.

Loeb, y Smith suponen, que el verme segrega una sustancia en el punto de implantación que previene la coagulación de la sangre como lo hacen las sanguijuelas, y que al desprenderse de la mucosa, para cambiar de sitio, deja una herida en ella que por algún tiempo sangra. Calculando que cada parásito chupe una gota de sangre diariamente, 500 producirían una pérdida de 20 gramos.

Los hechos que prueban cómo la posible hemorragia no es causa de la anémia en estos casos, son los siguientes:

1.—La presencia de sangre en las heces no es síntoma común, según nuestras experiencias.

2.—En los numerosos exámenes que hemos practicado, raras veces hemos visto al verme conteniendo sangre.

3.—En algunos indivíduos, la existencia de pocos vermes, que habrían de sustraer una cantidad insignificante de sangre, produce profunda anémia, que se cura por su expulsión.

Leichtenstern cree que el macho no es un chupador de sangre, y opina que cambios de lugar se verifican cada tres ó seis meses.

Durante este período es que se presentan los dolores cólicos y los trastornos intestinales, apareciendo algunas veces sangre en los excrementos. Después que se implantan de nuevo los gusanos en la mucosa desaparecen aquellos síntomas.

El mismo autor ha encontrado entre 14,000 vermes, un par en copulación, y 36 pares en otro grupo de 780 gusanos. Comparando el número de picadas ó punturas de la mucosa con el de helmintos, es mayor aquel que este.

Con respecto á nuestras investigaciones en lo que se refiere al cambio del parásito dentro del intestino, y á los síntomas que esta mudanza desarrolla, hemos de hacer notar que generalmente el caso infectado en Puerto Rico es víctima de contínuas reinfecciones y que nunca está con un número determinado de vermes. Por eso tales síntomas son más constantes aquí que lo señalados por esos autores, pues son más frecuentes las reinfecciones. Mosler, y Peiper creen que también se realiza este cambio de sitio cruzando el parásito por la submucosa.

Las últimas experiencias de Looss son de un interés muy grande. Afirma, que si hasta ahora todos los autores, salvo Sangalli, han creido que es un hirudo, para él la uncinaria se alimenta del moco intestinal, y que solo, incidentalmente, cuando á su paso buscando su alimento en la pared algún capilar encuentra, es que lo rasga. Claro es que, cuando esto último ocurre, según el tamaño del vaso, puede ser perceptible ó nó la sangre en los excrementos. Él promete, en su próximo trabajo demostrar un fragmento del tejido sub-mucoso del intestino del hombre en el exófago del verme, precisamente llegando á su intestino.

Considerando la pérdida de sangre por hemorragia jugando un papel muy secundario en esta clase de anemias, hemos de ver su causa principal, y la de muchos cambios patológicos en vida observados y comprobados en la autopsia, en una toxina. Las razones que abonan nuestra creencia que de una toxina específica se trata son las siguientes:

1.—Hay una marcada eosinofilia en esta enfermedad cuyo fenómeno lo discutiremos más adelante.

2.—Hay trastornos nerviosos que no guardan relación alguna con el estado anémico.

3.—Nótase una rápida mejoría en el estado mental del paciente, antes que el tratamiento haya hecho desaparecer otros síntomas principalmente el de la anemia.

4.—Obsérvase relativa inmunidad para el padecimiento en ciertos individuos que portan los parásitos. Si todos los infectados perdiendo igual cantidad de sangre, fuera esa hemorragia causa de su anemia, no se vería la diferente reacción á la infección que diariamente notamos.

5.—La prueba de Schaumann en la profunda anemia originada por el botriocephalus latus que no es un hirudo.

6.—Las recientes experiencias de Looss con sus perros, donde halla que la larva sin haber salido de su cápsula, produjo una fatal anemia.

7.—Los experimentos de Lussana, Bohland, Arslan, y otros demostrando la toxina.

8.—Por los casos de anemia en que datada la fecha de infección el parásito no ha llegado á su último ecdysis ni su cápsula bucal está preparada para la succión (caso especial 19, y otros).

9.—Las repetidas observaciones en que al principio de la enfermedad el cómputo de hematíes es normal ó casi normal, y la hemoglobina muy baja.

10. —Las investigaciones de Daniel, y de otros en el hígado y riñones de individuos muertos de uncinariasis, encontrando el pigmento amarillo indicador de la hemolisis.

11—Las hemorragias retinianas y otros estados frecuentemente observados en los ojos de los uncinariasicos.

Es oportuno que mencionemos cómo Felice Lussana, fué el primero en dudar de que la pérdida de sangre por hemorragia fuera la causa de esta anemia. El extrajo de la orina de enfermos de uncinariasis, antes del tratamiento, una sustancia que inyectada á los conejos, les produjo profunda anemia. Cuando las inyecciones fueron suspendidas, la sangre de estos animales rápidamente recobró su normalidad. Curados luego los pacientes de su enfermedad, volvió á repetir el experimento y no produjo la anemia en los referidos animales. Estas experiencias fueron confirmadas por Arslan, Crisafulli, de Renzi, y otros, y Bohland, Battistini, y Micheli probaron la descomposición de la albumina por la adición de la sustancia tóxica de tales pacientes,

Influyen indudablemente en esta anemia las lesiones de la mucosa producida por el parásito, que mantienen una crónica inflamación, y dejan una puerta de entrada para la invasión de los micro-organismos. A medida que la enfermedad progresa, afectándose por lógica consecuencia los distintos órganos, el empobrecimiento y deterioración de la sangre se hace mayor.

ANATOMÍA PATOLÓGICA.

Los datos recogidos en las autopsias por nosotros practicadas, y los que la literatura del asunto nos proporciona son los que aquí resumimos.

La piel aparece de un color amarillo-limón ó cereo, el cuerpo no está emaciado, hay abundante grasa sub-cutánea, los músculos muy pálidos y friables. Todos los órganos están extremadamente pálidos y casi exangües al corte. Hay generalmente edemas, y muchas veces ascitis, hidrotorax, hidropericardias, y derrame en los ventrículos cerebrales. La médula de los huesos es de color grisáceo rojizo, y tiene poca cantidad de grasa.

El *corazón*, nos ha sorprendido distintas veces encontrarlo, con su tamaño normal aunque ordinariamente engrosado, con lesiones valvulares secundarias, y dilatación sub-siguiente. En muchas ocasiones hay hipertrofia del ventrículo izquierdo y pequeños coágulos oscuros se observan en las cavidades. Es frecuente encontrar en este órgano aumento de la grasa periférica. Algunas veces hay marcada degeneración grasosa de la base de los músculos papilares, notándose un punto amarilloso á la sección. En algunos casos endoarteritis aórtica, con lesiones valvulares. Sandwith informa tres de estos casos en diez autopsias, con lesión mitral. Estas lesiones secundarias no son raras y causan la muerte en algunos pacientes cuya anemia es muy ligera cuando les sorprende aquella.

El *edema pulmonar* es frecuente, y es notable en este órgano la anemia.

El *bazo* no está generalmente aumentado de volúmen, pero es friable. Un tercio de los casos de Sandwith, mostraron sin embargo aumento.

El *hígado* es muy pálido, no está tampoco aumentado ,y aparece de color bronceado y de amarillo verdoso al corte. Es en extremo friable. De acuerdo con nuestras observaciones, esta apariencia de la víscera es constante y marcada. Scheube dice que raramente ha encontrado degeneración amiloidea.

En el *páncreas* no se observan cambios notables, sino en caso de extrema anemia, y aunque algunos autores brasileños registran aumento en este órgano nosotros no lo hemos podido hallar.

Los *riñones* son muy pálidos, y tienen abundante grasa. Sufren á veces inflamación intersticial ó degeneración amiloide. Pero en términos generales no son notables sus cambios. Sandwith, y Capps refieren haber hallado pequeños quistes en su interior.

El *estómago* está generalmente dilatado, á veces en grado extremo, y es sitio de catarro crónico. Nosotros hemos encontrado algunas uncinarias libres en su cavidad, pero no enclavadas en las paredes. En cambio, en los intestinos, y sobre todo en el yeyuno es donde se encuentran en mayor número, aunque también las hemos hallado en el duodeno. Sandwith cree, que el sitio de preferencia es el comprendido entre dos metros á partir del píloro, donde en un caso encontró de 863 uncinarias, 217 fuertemente enclavadas en la mucosa. Nosotros no hemos observado muchos vermes en tal disposición. En la autopsia citada en el artículo de American Medicine, Septiembre 12, se encontraron 1,487 uncinarias, de ellas 83 en el estómago, acaso accidentalmente allí, 169 en el duodeno y el resto en el yeyuno. La discrepancia en la adherencia del verme á la mucosa, es debida probablemente á la distinta armadura bucal de la especie del viejo mundo, que tiene ganchos para fijarse á la pared intestinal.

Sandwith refiere, que de 18 casos que no habían tomado timol, 6 tenían ménos de 10 vermes, y Oswald Baker explica esto, por la misma razón que las ratas abandonan una casa vacía, es decir; porque perdiendo su alimento en el cadáver, los parásitos salen del intestino. Nosotros no hemos observado que las lesiones descritas por Roth y otros fueran tan marcadas en la uncinaria americana. Estas lesiones son puntos ó manchas equimóticas en la mucosa, de un milímetro á un centímetro de largo. Roth las describe como pequeños nódulos de .8 m.m. de diámetro con un centro rojizo de .3 m.m. En nuestras autopsias este rastro de la uncinaria en la mucosa pudo pasar sin ser notado. Sandwith ha encontrado los vermes con medio cuerpo introducido en la mucosa y se habla de sacos sanguinolentos en la submucosa conteniendo uncinarias según los describen Bilharz, y Grassi. Es interesante hacer notar que en estos pequeños sacos ó quistes encontró Grassi larvas sin desarrollarse.

Muchas veces se encuentran más punturas que parásitos. Sandwith observó 575 puntos de equímosis en un caso, donde solo halló 250 uncinarias.

Mosler, y Peiper, refieren haber hallado grandes equímosis en la mucosa, desde el tamaño de 2 á 4 centímetros de diámetro, debido á la aglomeración de uncinarias, en un sitio determinado. Otros han encontrado moco sanguinolento, y hemorragia, en los intestinos delgados.

En nuestras autopsias, no hemos podido observar estos fenómenos. Sandwith notó la hemorragia en dos de sus 26 casos. Williams refiere una úlcera perforante del yeyuno, debida á uncinarias, y Wucherer cita peritonitis á ellas atribuida. Estas lesiones nos ponen sobre aviso, para tener en cuenta el origen de algunos trastornos de esta ó parecida naturaleza. Un síntoma de intenso malestar que acusa en ocasiones el paciente, es debido á la inflamación intersticial crónica de la mucosa del intestino, que el verme produce con su armadura bucal. Wucherer nota una estrechez del lumen del intestino, y nosotros hemos podido observar un notable adelgazamiento de las paredes.

Otros cambios, como infiltración de las folículos solitarios, placas de Peyer, y degeneración amiloidea de las válvulas, han sido registrados por distintos autores.

En cuanto al cerebro, y médula, nosotros hemos tenido casos de muerte por derrame seroso en los ventrículos.

La siguiente autopsia clínica de uno de nuestros enfermos, señala los principales cambios patológicos.

S. J. C. Admitido en el hospital, Agosto 30. Edad 9 años; color pajizo. Su apariencia, la de una figura de cera. Edema de la cara y extremi dades. No acusaba dolor gástrico. Lengua, con las dos líneas grises cerca de los bordes. Nada de particular en las heces fecales, excepto un enorme número de huevos de uncinaria, muchos de ascaris, y algunos de tricocéfalus. Aqueja intensa disnea, y palpitaciones de corazón. Pulso, 120; débil y compresible. Corazón dilatado, y marcado soplo anémico. Notable pulsación de las yugulares. Contínuos mareos; zumbido de oidos, dolor de cabeza constante. Reflejo rotuliano abolido. Músculos débiles y adoloridos. Este niño fué llevado al Hospital Municipal de Bayamón, en gravísimo estado; casi moribundo.

El exámen de la sangre denotó una fluidez extrema, y muy lenta á la coagulación. Hb. 8%: glóbulos rojos, 720,000 por m. m. c.: leucocitos 9,000. Cómputo diferencial: E., 1.2; P., 74.4; L. P., 21.6; L. G., 2; B., 0.8. Los hematíes con los cambios característicos de toda profunda anemia.

Tratamiento. Estimulantes. Septiembre 1º, se le administró 1 gr. de timol precedido y seguido de 10 gr. de sulfato de sosa. Al siguiente día, se encontró mucho mejor, y el 3 por la tarde, mientras hablaba con otros, y se reía, fué repentinamente víctima de un derrame seroso en las ventrículos cerebrales. El exámen de la orina no señaló la presencia de timol, ni nada anormal.

Autopsia. Septiembre 4. 9.30 a. m. Cuerpo bien nutrido. Abundante grasa subcutánea. Anasarca. No había rigidez cadavérica. Sistema muscular débil, friable, y extremadamente pálido. La médula del esternón grisácea rojiza. Pulmones muy anémicos con marcado edema posterior. Cada pleura contenía alrededor de 100 c.c. de líquido seroso. Corazón normal en tamaño, con pequeños coágulos amarillentos en el lado izquierdo. El músculo muy anémico, con marcado color ceniciento, y puntos de degeneración. Grasa subperitoneal, y en el omento, muy abundante. El líquido contenido en el peritoneo, aunque no fué medido, se calculó en 500 c.c. Bazo encogido y friable. Estómago, muy dilatado. Gran número de uncinarias americanas, libres en los intestinos. Riñones de color muy pálido, y las cápsulas fácilmente separables. Apéndice normal. Hígado, de color amarillo oscuro, amarillo verdoso al corte, muy friable.

HEMATOLOGIA.

La sangre va perdiendo gradualmente su color y consistencia hasta aparecer en los casos graves extremadamente pálida, muy fluida y acuosa. A veces al puncionar el lóbulo de la oreja para obtener una gota, es un exudado el que fluye difícil de recojer para el examen.

La coagulación se verifica con bastante lentitud aunque no hemos precisado exactamente su tardanza como tampoco hemos obtenido la reacción, peso específico, volúmen de corpúsculos, y volúmen general del líquido hemático por falta de tiempo y de instrumental.

Hemoglobina. Durante nuestros trabajos hemos tenido en uso los hemoglobinómetros de von Fleischl, Gower, y Dare, habiendo observado algunas variaciones en el resultado, operando con la misma gota en los diferentes instrumentos. Más, como empezamos nuestras observaciones con el primeramente citado, con él seguimos aunque acusa cifras un poco más bajas que los otros. Para aquellos que no puedan proporcionarse un instrumento costoso, muchos autores recomiendan el de Tallqvist de bastante seguridad para la clínica.

Estimando la hemoglobina como el mejor índice del grado de anemia, fué su tanto por ciento precisado en 579 casos de Bayamón al ingresar. Con tasas de 9 á 10%, el promedio fué 43.09%.

En un caso de Utuado registramos 8%, y el paciente mejoró notablemente habiendo quedado en el Hospital de aquel pueblo con motivo de nuestra marcha de allí.

En los casos de tasa baja, la cantidad de sangre se duplicaba ó triplicaba y el resultado se dividía.

Los casos especiales de Utuado varían de 9 á 65% con un término medio de 24.38%, pero esta cifra no representa la media de todos los casos de Utuado, pues ella incluye los casos graves elegidos con el propósito de estudiarlos.

En los 579 mencionados, la operación fué repetida en 423 en sucesivas visitas con los siguientes resultados: 371 ganaron de 1 á 71%, con un medio 21.34+ %; 45 perdieron de 1 á 16%, con un medio de 5.04%+; 7 ni ganaron ni perdieron. Es de notar que estos estuvieron poco tiempo bajo tratamiento: solo algunos, más de seis semanas.

La palidez de la piel no guarda constante relación con la tasa de hemoglobina y es una guía engañosa. Nosotros preferimos la conjuntiva, aunque también induce á error en los casos de tracoma. El alza en la hemoglobina no es regular, y está sujeto á marcadas variaciones en el mismo individuo. En unos baja al principio del tratamiento para subir luego, y en otros sube, baja después para levantar de nuevo decididamente. En los 423 anteriormente referidos, en que se hizo el exámen varias veces, 45 subieron después de perder más de 3%, y 38 bajaron más de 3% después de haber subido.

Los del último grupo y los 45 que habían perdido, si se hubieran examinado después, tal vez hubieran tenido un promedio de aumento.

Este curso irregular fué también observado en los casos especiales (Apéndice). En 42 de éstos la hemoglobina subió á 85% ó más, que dá un término medio de 100.38%. Un alza semanal de 20 á 30% no deja de ser común y en el caso 58 fué de 42%.

Nosotros creemos que dos factores tienen en esto influencia: (1) los órganos hematopoyéticos que estaban con gran actividad luchando para anular la hemolisis, se encuentran repentinamente con una oposición más débil debida á la expulsión de un gran número de parásitos; y un aumento real se realiza: (2) aunque no conformes con Boycott y Haldane que estiman esta anemia como simple dilución de la sangre, sin embargo de que en sus casos aparece haber más ó ménos aumento del volúmen, el progreso de curación modifica más ó ménos rápidamente el estado de la sangre produciendo un relativo aumento.

La hemoglobina baja ántes que el número de hematíes, y puede perder un 30% sin que un notable cambio se observe en los glóbulos rojos. En todos nuestros casos especiales, la riqueza globular fué 0.5 tomando 100% de hemoglobina y 5,000,000 de glóbulos como unidad. En un solo caso rebasó la normal, en el caso 26, cuyo índice de color fué 1.1.

Bajo el tratamiento, los glóbulos rojos aumentan más pronto que la hemoglobina, sobre todo cuando ésta sube con lentitud. La influencia de unos pocos parásitos sobre la hemoglobina varía en los diferentes individuos. En unos va subiendo, aunque lentamente, hasta que todos los vermes son expulsados, y en otros con muy pocos parásitos, cuyos huevecillos no se encuentran en los excrementos, sino después de repetidos exámenes, la hemoglobina se mantiene baja ó sube un poco y se estaciona. Nosotros registramos un caso de esta índole en el que después de una dósis de timol subió rápidamente la hemoglobina. En otros casos la tasa normal puede alcanzarse aun apareciendo en las heces pocos huevecillos.

Hematíes: Los cómputos fueron hechos con el aparato de Thoma contando 180 cuadrados y usando las soluciones de Gower, y Toisson diluyendo 1:200. Muchas veces los cómputos se repetían cuando se estimaba alguna desproporción. El procedimiento requería mucho tiempo para aplicarlo á los pacientes del Dispensario, y solo en los casos especiales se llevó á efecto. En estos 61 casos especiales, el medio por ciento á su entrada fué 2,406,416 por m.m.c. El cómputo más bajo fué de 754,000, caso que falleció; pero el 38, con 880,000 curó completamente alcanzando 5,354,000 en diez semanas. El caso 57 con 5,025,600 fué el cómputo más alto al ingreso. Considerando todos los grados de la enfermedad en Puerto Rico, este término medio es muy bajo, pues nuestra experiencia nos ha demostrado que los hematíes disminuyen ménos en los casos medianos.

Cuando la anemia progresa los hematíes adquieren la propiedad policromatofílica y sufren poikilocitosis. Nunca hemos dejado de ver estas dos propiedades en los casos intensos. Macrocitos y microcitos se observan constantemente en tales casos, y mientras estos últimos por regla general son más numerosos que aquellos, los macrocitos predominan en muchos, semejando algunos con su forma oval y con la presencia de megaloblastos, casos de anemia perniciosa (los 12, 17, 25, y 59 del Apéndice). Aunque se ha dicho que estas anemias secundarias pueden ocasionar la anemia perniciosa, los megaloblastos son excepcionalmente muy grandes.

Los normoblastos no dejan de ser comunes y en ocasiones aumentan cuando los megaloblastos tienden á disminuir. La microcitosis sucede á la macrocitosis cuando la mejoría progresa. Los tamaños extremos de los hematíes los hemos visto en los casos muy graves.

La regeneración de los glóbulos rojos se verifica rápidamente alcanzando y superando á la cifra normal muchas veces ántes que la hemoglobina. En los 42 casos en que la tasa final de hemoglobina alcanzó un medio de 100.38%, el cómputo final de hematíes fué 5,624,197, debiéndose el exceso sin duda á la presencia todavía de microcitos en dichos casos.

En general, cuando la hemoglobina sube rápidamente, los glóbulos rojos la siguen, pero algunas veces como en el caso 39 la ascensión es periódica.

Leucocitos. No nos ha sido posible encontrar una leucocitosis característica de la uncinariasis. En la mayoría de los casos, el número de glóbulos blancos osciló entre 5,000 y 10,000 por m.m.c. y frecuentemente en casos crónicos de larga fecha hubo leucopenia.

El término medio de nuestros 61 casos especiales fué 8,009 por m.m.c. al ingreso, y el de los 42 curados 9,041; de los 16 mejorados ó prácticamente curados 7,533; y de los tres pacientes que fallecieron 14,133 por m.m.c.

El cómputo diferencial de los leucocitos se hizo según las reglas generales. La solución colorante de Jenner fué la usada generalmente, habiéndonos dado excelentes resultados. Es indudablemente una de las mejores preparaciones para estos países, donde la luz es muy fuerte y la humedad grande, conservándose en mejor estado que otras. Las de Wright, Leischman, y Goldhorn son también fáciles de conservar pero nosotros no las tuvimos al principio de nuestro trabajo. El reactivo tri-acido de Ehrlich y otros varios conocidos, fácilmente se alteran. Las grandes ventajas de un reactivo colorante y fijador al mismo tiempo, se aprecian en un trabajo como el nuestro donde solo disponíamos de un laboratorio provisional.

El cómputo lo hacíamos de 250 leucocitos número suficiente para obtener un tanto por ciento correcto.

En los casos marcados de la enfermedad se observó marcada degeneración de estas células. Muy notable en las eosinófilas, bastante común en las polimorfo-nucleares neutrófilas, y en los grandes linfocitos. Leucocitos pálidos, carcomidos, núcleos sin protoplasma y con solo algunos gránulos para distinguir los neutrófilos, muchos fragmentados, otros con vacuolas, etc. se registraron con frecuencia. Mitosis ó aparente mitosis tanto en los leucocitos eosinófilos como en los polimorfo-nuculares se observó. Muchos neutrófilos irregulares en tamaño, con pérdida de gránulos en unos, y grandes gránulos en otros, se notó también.

Eosinófilos. Estas células son las de mayor interés. Las conclusiones siguientes (que fueron establecidas en el informe de Ponce de 1903) pondrán de manifiesto su importancia.

1.—En los casos crónicos graves en que hay pocas resistencias y los órganos hematopoyéticos están agotados, la eosinofilia es baja ó no se presenta. Tal ha ocurrido en nuestros casos especiales; muchos de ellos, sufriendo una fuerte infección aguda sobre crónica uncinariasis de gravedad desconocida. Leichtenstern refiere un caso de 72% de eosinófilos poco antes de morir, pero esta es una excepción que no niega la regla general. También nosotros tuvimos una muchacha (caso 33, especial) que murió en estado comatoso debido indudablemente á un derrame cerebral, y cuyo tanto por ciento de eosinófilos al ingresar fué de 6.4%, habiendo muerto con 20.8%.

2.—Una subida en eosinofilia es de pronóstico favorable especialmente en los casos á que antes nos referimos. Hay ciertos casos, sin embargo, en los que no podemos explicarnos, cómo con tasa baja de estas células la mejoría se observa, muchas veces rápidamente aunque es lo general que sea con lentitud.

3.—En los casos graves, con poca ó ninguna eosinofilia, una baja en sus eosinófilos, augura un resultado fatal.

En general, las resistencias del organismo á la toxina, se manifiestan en la eosinofilia. Nuestros casos especiales, habiendo sido todos por regla general, de tipo grave, dieron un término medio de 10.8%, antes del tratamiento, y la última apreciación, después de concluida toda medicación, dió un término medio de 13.2%. Como de los 61 casos especiales, 42 fueron completamente curados, y 15 quedaron muy cerca de su curación, claro es que, el número de uncinarias *per se*, no tiene influencia alguna, directa, sobre la eosinofilia. La relación que encuentran algunos entre la eosinofilia, y la presencia de cristales de Charcot-Leyden en las heces, no ha sido encontrada por nosotros en algunos de nuestros casos de estudio (véase Apéndice).

La eosinofilia, sufre grandes variaciones en el curso del tratamiento. Hemos observado una elevación de su tanto por ciento, según los individuos, bajando después de esto á su tasa normal. Esta baja á la normal puede ocurrir antes que el paciente recobre su tasa fisiológica de hemoglobina ó algún tiempo después. De todas suertes el alza y baja de la eosinofilia en el curso del tratamiento es todavía un fenómeno que no nos podemos explicar.

Ahora bien; el estudio de la eosinofilia merece algunas consideraciones. ¿Indica la eosinofilia la regeneración de la sangre por el aumento de actividad de los órganos hematopoyéticos? ¿Son éllos, los eosinófilos, los encargados directamente de la defensa, y se originan por exitaciones de esta toxina? Muchas son las teorías concernientes á la eosinofilia para que podamos citarlas, y solo haremos mención de la de Weiss citada por Ewing que dice "la eosinofilia local tiende á aparecer cuando hay una gran extravasación de la sangre, y los derivados de la hemoglobina son absorvidos por los polinucleares y depositados en forma de gránulos eosinófilos."

Por lo demás, en nuestras investigaciones hemos encontrado siempre los eosinófilos de mayor tamaño que lo normal, á veces muy grandes, con tendencia á degeneración y con señales de evidente fragilidad. Los gránulos son también muy gruesos. Los mielocitos son más frecuentemente eosinofílicos que neutrofílicos.

Grandes y pequeños linfocitos. En nuestros cómputos hemos preferido la clasificación de Cabot á la de Ewing por motivo de conveniencia, pues no envuelve ninguna esencial cuestión por lo que á los grandes mononucleares se refiere. Hemos, pues, considerado pequeños linfocitos á todos aquellos que tienen ménos de 10 micro-milímetros de diámetro, y grandes á todos los que tienen más. En algunos casos hemos notado decidido aumento de estos últimos.

Las *células de Türck* ó "células de estimulación" no fueron anotados por nosotros al principio, y las incluimos como linfocitos; pero dos ó tres semanas después de empezado nuestro trabajo con los casos especiales, las incluímos ya en su verdadera clasificación habiendo observado preciosos ejemplos de ellas. La gran irregularidad en su aparición no permite todavía concederles ningún papel especial en esta enfermedad.

Los *mielocitos* aparecen de vez en cuando.

Los *basófilos*, los hemos observado aumentados muchas veces.

Gránulos basofílicos aparecieron en muchos especialmente en los linfocitos.

En resúmen: el término medio de las 4 principales clases de leucocitos tomado en 29 casos ántes del tratamiento, y en lo que se observó un 10% ó más de eosinofilia es el siguiente:

Eosinófilos	17. 1
Polimorfonucleares	54. 5
Linfocitos pequeños	16. 3
Linfocitos grandes	8. 6
	96. 5
Otros leucocitos	3. 5
	100. 0

Según Ewing el total de linfocitos puede variar en la sangre normal de 24 á 29. Segun Cabot de 24 á 38. Nuestro total es 24. 9, que se aproxima á la cifra más baja de estos autores. Nuestro tanto por ciento de linfocitos pequeños es más bajo que el normal que dan dichas autoridades, y el de los grandes linfocitos es bastante mayor que el máximo de la cifra normal, en relación con lo notado por Ewing. Según esto, puede observarse que estos últimos han ganado á expensas de los pequeños.

La cifra de los polimorfonucleares neutrófilos, se observa que ha bajado desde luego del tipo normal, pues Cabot dá para ellos 62 á 70%, y Ewing 70 á 72%, pero los eosinófilos han ganado próximamente lo que aquellos perdieron.

También puede observarse que no ha habido leucocitosis eosinofílica.

SINTOMATOLOGIA.

Muchos escritores entienden que los síntomas de la *uncinariasis* no son otros que los de una simple anemia. Tal apreciación es muy limitada para un padecimiento que tiene una entidad clínica definida. Variedades de agudeza y cronicidad en él se observan, y no es raro encontrar dentro de una forma crónica una agudización de la dolencia.

Para conveniencia de la descripción habremos de estudiar bajo tres formas clínicas la enfermedad: *ligera*, *mediana*, ó *intensa*, incluyendo en este último las de tipo grave ó extremo.

La simple presencia del verme en el intestino no constituye necesariamente la *uncinariasis*. Las personas portadoras de pocos helmintos tienen con ellos la causa que podrá en un momento dado desarrollar la enfermedad bajo cualquier influencia, que no afectaría á aquellos que no lleven el parásito. Excepto los casos de inmunidad relativa, tales personas portan comparativamente pocos parásitos. Pero, cuando estos alcanzan el número de 300 ó 400, los síntomas se manifiestan si las resistencias á la toxina no son bastantes á impedirlos En general la *uncinariasis* depende mas de una intensidad de infección.

Casos ligeros. Son aquellos que aparecen con poca ó ninguna palidez, ó mejor con un indefinido tinte amarillo en los blancos y un ligero grisáceo en los mulatos; y con alguna disminucion de la total perspiración. El apetito es caprichoso. Ataques de gastralgia se presentan algunas veces, y los enfermos acusan un malestar epigástrico, tendencia al meteorismo, respiración algo anhelosa durante el ejercicio, ligera palpitación de corazón, mareos, dolor de cabeza, falta de atención, y un pequeño embotamiento de las facultades intelectuales. Los músculos estan debilitados y blandos, y hay apatía ó negligencia para el trabajo. La hemoglobina en tales individuos varía de 60% á la normal, los primeros aparentando á veces buen color.

Casos medianos. Esta es la forma mas generalmente observada en Puerto Rico. Todos los síntomas que acusan los casos ligeros se marcan más aquí. Se nota la palidez de la piel. Las membranas mucosas más pálidas que lo normal. La piel está seca, y la sudoración es rara. El apetito puede estar alterado hasta llegar á la bulimia; á veces hay geofagia. La lengua es saburrosa. De ordinario hay náuseas, en ocasiones vómitos. Dilatación de estómago y dolor epigástrico. Palpitaciones frecuentes é intensas, no siempre en relación con el ejercicio realizado. El pulso es más rápido, débil, y compresible. Percíbese un murmullo cardiaco, soplo presistólico, y una pequeña hipertrofia. La pulsación de los vasos del cuello es notable. Hay dolor en el esternón y en el pecho. Debilidad en las rodillas y piernas. Muchos mareos especialmente al cambio de posición, zumbido de oidos, frecuente dolor de cabeza, acusa el paciente que por lo demás está triste, melancólico, realizando á duras penas cualquier trabajo. Algunas veces está el reflejo rotuliano exagerado al principio y luego amortigüado ó totalmente abolido. El enfermo es sensible al frío y siente sus piés pesados, entumecidos. En ocasiones la perversión de la sensibilidad se manifiesta por hormigueos y pinchazos en las extremidades inferiores. La debilidad muscular y el dolor en las articulaciones son muy marcados, simulando reumatismo, bajo cuyo diagnóstico se incluyen muchas veces erróneamente estas manifestaciones. La hemoglobina en estos casos alcanza un 30% ó un 60%.

Casos intensos y graves. El paciente se presenta en un estado del que no es difícil augurar un término fatal. La palidez es extrema. El edema de piés y piernas es grande. Muchas veces hay anasarca. El apetito es nulo ó extremadamente exagerado, observándose las peores formas de geofagia. Las náuseas y vómitos son muy frecuentes. Hay ascitis. La diarrea alterna con estreñimiento; pero predomina más aquella. La disnea es intensa al menor esfuerzo, y muchas veces en pleno reposo. Las palpitaciones de corazón son más fuertes, y el dolor precordial constante. El pulso es rápido, débil, y compresible. Hay dilatación del centro cardiaco, marcada pulsación en los vasos del cuello que se propaga y puede observarse en la base del mismo.

En las grandes venas, bruit-de-diable. Intensos mareos y contínuo zumbido de oidos. Mucho dolor de cabeza é insomnio. El reflejo rotuliano está abolido. La impotencia en el hombre es síntoma constante, así como la amenorrea en la mujer. Las facultades intelectuales están entorpecidas: el proceso en la coordinación de las ideas es tardo y el enfermo aparece idiotizado. Su expresión es la de un melancólico. Las parestesias son muy marcadas. Hay tendencia á la dilatación pupilar y la visión es oscurecida. La gravedad específica de la orina es baja y su secreción abundante, no encontrándose comunmente albúmina.

La flacidez y dolor muscular son muy grandes. Extrema debilidad é inacción de las piernas que simulan parálisis, incapacitando al paciente para todo trabajo. Temperatura irregular; fiebre á veces, otras temperatura sub-normal.

Delineados aunque á la ligera, los tipos de la enfermedad, admitimos una forma *aguda de uncinariasis* caracterizada por síntomas digestivos intensos, rápida hemolisis, trastornos nerviosos, tendencia al edema y derrame en las cavidades serosas.

Mazamorra. La lesión ha sido descrita en la Patogenia. Desde una simple pápula hasta una fuerte dermatitis que obliga al enfermo á guardar cama, hay diversa gradación. La erupción se encuentra generalmente entre los dedos del pié y sobre el dorso del mismo, dando motivo á contínua picazón y molestias que son á veces insoportables. Cuando las pústulas se forman, la picazón se alivia; pero hay entonces dolor, calor, y tumefacción. No es el pié el solo sitio de elección; puede presentarse en las piernas y en cualquier parte del cuerpo. La hemos observado en las manos de algunas lavanderas y otras personas de distintos oficios, y un raro caso registramos de infección en la cara.

Mazamorra llaman los campesinos de este país á la dermatitis producida por la larva de uncinaria. Dicen éllos que en su piel penetra una *culebrita* que se encuentra en ciertos charcos, en sitios donde hay materias vegetales en descomposición, y en el lodo, distinguiendo perfectamente estas inflamaciones ó erupciones de las por otras causas originadas. Las clases acomodadas ignoran generalmente el nombre dado á estas manifestaciones, así como tampoco saben el factor que las produce, y algunas veces dan ese nombre á otras erupciones.

Mazamorra, es una palabra castiza impropiamente aplicada por nuestro labriego para denominar la dermatitis referida, y el agente que la engendra sin que hallamos podido averiguar la relación que puede haber entre la acepción propia y la que él le dá. Forzando un poco el símil tal vez la hallaremos en la "comida compuesta de harina de maíz con azúcar ó miel, semejante á poleadas que se usa en el Perú entre gente pobre" siendo así que pudiera parecer papilla ó poleada, las sustancias vegetales en descomposición en un terreno fangoso de donde sale la *mazamorra.* O, acaso en la acepción de "cosa desmoronada y reducida á piezas menudas aunque no sean comestibles" por la relación que hay entre los restos desmenuzados de los tallos, hojas, cáscaras, ó frutos que al pequeño charco afluyen para engendrar la *mazamorra.*

Las lesiones que la mazamorra origina cicatrizan en una ó dos semanas cuando no siguen ulceraciones de importancia que se incluyen bajo los nombres de úlceras anémicas, sifilíticas, varicosas, tropicales, etc. Tales úlceras son muy rebeldes al tratamiento. Es conveniente observar que á los ocho días después de la aparición de mazamorra ó á los dos meses es que el paciente acusa dolor de estómago, malestar, debilidad, respiración anhelosa al ejercicio, y acaso un poco de fiebre en ciertos individuos. Estos síntomas concuerdan con los observados después de los ocho días de la infección por uncinaria, en el caso experimental de Claude Smith.

Palidez. No es una simple pérdida del color normal la que se nota. Hay siempre un tinte subictérico; pero que no llega nunca al ictérico verdadero. El color en esta anemia se ha descrito siempre como amarillo-limón, de cera, blanco amarillento, curtido, seboso, amarillo-verdoso, etc., pero nosotros preferimos llamarlo amarillo-sucio Claro es, que el color lo modifican la complexión individual, la raza, etc. En los mulatos es un tinte grisáceo: en los negros, este color grís es más oscuro.

Por lo demás, nada hay más engañoso que la coloración del rostro, con relación á la tasa de hemoglobina. Nosotros hemos tratado de calcular, por simple apreciación de la coloración de la cara, el grado de hemoglobina, practicando luego el examen con el hemoglobinómetro, y los resultados obtenidos fueron los siguientes:

Tabla 12.—

"No muy notable"	Hb.	40%
"Poco marcada"	"	39, 42, 50, 54%
"Pronunciada"	"	65, 62%
"Marcada"	"	58, 86%
"Ligeramente marcada"	"	24, 44, 47%
"Ninguna"	"	43, 57%
"Relativamente intensa"	"	58%
"Decidida"	"	74%
"Moderada"	"	22, 32, 33, 34%
"Amarillo grisácea"	"	62%
"Muy pálida"	"	70%

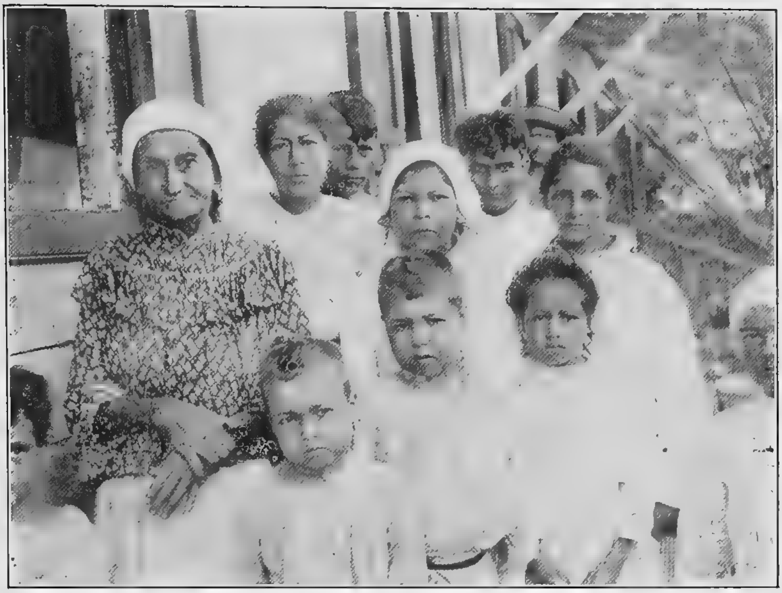
De un modo general, sin embargo, es el color de la piel el que dá idea del estado anémico de la mayoría de los habitantes de esta Isla, principalmente, á los continentales y europeos que á ella vienen.

La proporción de nuestros casos, en relación con su grado de anemia fué, en 146 casos de Bayamón, la siguiente:

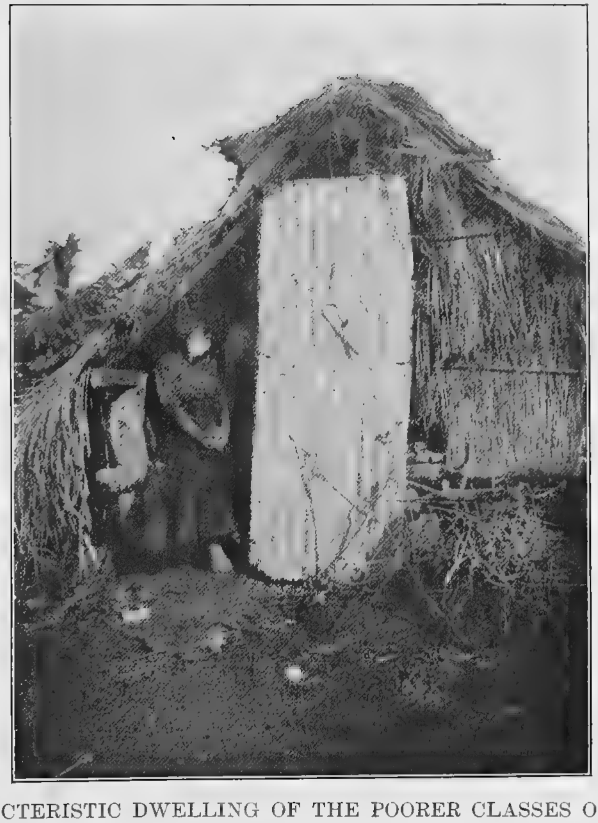
Tabla 13.—

Normales	4
Ligeros	17
Medianos	30
Intensos	48
Extremos	47
	146

Comparando la palidez con el tipo clínico, anotamos 337 casos de Bayamón, que son:



GROUP OF PATIENTS AT BAYAMON.
UN GRUPO DE "ANÉMICOS" EN BAYAMÓN.



CHARACTERISTIC DWELLING OF THE POORER CLASSES OF THE COUNTRY.
BOHÍO DE LA GENTE MÁS POBRE EN LA ISLA.

Tabla 14.—

Casos ligeros	10
Medianos	71
Intensos	193
Extremos	63
	337

De estos, 87 tenían edema, y 109 síntomas nerviosos muy marcados.

Algunos casos, sin una profunda anemia presentan síntomas clínicos alarmantes.

La tasa de hemoglobina en 65 casos de esta naturaleza, fué la siguiente:

Tabla 15.—

Entre 50 y 54%	8	personas.
" 55 " 59%	10	"
" 60 " 64%	15	"
" 65 " 69%	10	"
" 70 " 74%	7	"
" 75 " 79%	6	"
" 80 " 84%	2	"
" 85 " 89%	4	"
" 90 " 95%	3	"
	65	

La inspección de las mucosas ofrece más probabilidades de acierto en la apreciación de la anemia, especialmente la conjuntiva. Si no hay inflamación de ésta y se tiene cuidado de presionar poco á fin de no comprimir los pequeños vasos, se consigue bajando ó volviendo ligeramente el párpado inferior, calcular la hemoglobina (con alguna costumbre) sufriendo un error de 20%.

Muchas veces es difícil marcar el límite de coloración entre la mucosa de los labios y la piel adyacente. El bulbo de la conjuntiva empieza á palidecer, luego el saco se torna gris, y aparece por último de un tinte lechoso amarillento. La esclerótica es blanca ó ligeramente amarilla y brillante, distinta á la que se presenta en la caquexia palúdica.

La palidez es general, y muchas veces aparece nuestro paciente del color de una figura de cera. En ocasiones aumenta el pigmento y efélides, y cloasma se notan. Casos complicados, muestran los labios cianóticos.

El cuerpo, sin embargo, está bien nutrido. La carne está flácida, pero en los casos medianos no hay edema. En ciertos grados del padecimiento hay anasarca. La emaciación no es síntoma usual de uncinariasis y si se presenta es á consecuencia de enfermedades intercurrentes, inanición, graves trastornos gástricos, etc.

Edema: En general es el edema un síntoma final, debido á trastornos circulatorios que no debe confundirse con el edema frecuente, por concurrencia bacilar, de que hablaremos en el capítulo Complicaciones. En todos los casos graves, no tiene nada de extraño encontrar edematosas las extremidades inferiores, edema que empieza en el pié y rótula, sigue á las piernas, invade el escroto ó vulva infiltrándolos á veces de manera enorme, sube á la cara apareciendo primero en los párpados y mejillas, y por último abarca todo el cuerpo. Un caso extremo de estos anasarcas tuvimos, que puede servir de modelo. Tratábase de una total infiltración en una muchacha, que la hacía aparecer como una masa informe. No podía andar, no se consiguió que abriera los ojos porque los párpados hinchados lo impedían, el pulso apenas se percibía á través del enorme abultamiento de los tejidos, donde quedaba la huella de los dedos, impresa. Sin embargo, esta enferma despues de la expulsión de sus parásitos, y bajo la medicación oportuna, recobró por completo su salud; levantando su hemoglobina de 20 á 98%. Pero cuando estos edemas son el resultado de una lesión cardiaca, por degeneración, esclerósis valvular, existente con anteriodidad á la uncinariasis ó secuela de ella, el cuadro entonces no se modifica por la desaparición de los vermes. Un caso, antítesis del anterior, registramos con 65% de hemoglobina, que habiendo expulsado sus uncinarias á la segunda semana, persistieron los fenómenos hidrópicos, y falleció después de 55 días de tratamiento á consecuencia de una lesión valvular. La orina examinada, como en todos los casos de edema, no mostró albúmina.

La tabla siguiente muestra una clasificación de nuestros pacientes edematosos en Bayamón, según su tasa de hemoglobina:

Tabla 16.—

Menos de 20%	7	personas.
Entre 20 y 29%	22	“
“ 30 “ 39%	23	“
“ 40 “ 49%	12	“
“ 50 “ 59%	4	“
“ 60 “ 69%	7	“
“ 70 “ 79%	2	“
“ 80 “ 89%	2	“
	79	

Otro de los síntomas objetivos de este padecimiento, es la atrofia de la piel; muy marcada en los casos crónicos. La de la cara especialmente, se nota arrugada, contraida y áspera, dando apariencia de viejos á sujetos muy jóvenes. Después del tratamiento, recobra el tejido su suavidad.

La falta de perspiración, es otro síntoma que los pacientes acusan, y que desaparece con la medicación antihelmintica. Estos refieren que después de estar enfermos no han sudado, ni aún cuando hicieran un trabajo fuerte y al sol.

Petequias se observan algunas veces, y de prurito general se quejan en ocasiones los uncinariásicos.

El cansancio y agotamiento muscular es notable en estos enfermos, llegando á veces á haber una impotencia completa de ciertos músculos, con fuertes dolores y calambres, simulando verdaderas parálisis, que se excluyen después de cuidadoso exámen. Estos casos, con los síntomas de corazón y edemas pueden ser tomados por beri-beri, por aquellos que no han visto nunca esta enfermedad. Uno de los escritores tuvo ocasion de estudiar varios enfermos de beri-beri en Cádiz (1895), y el cuadro clínico es totalmente distinto al de la *uncinariasis.*

Considerando esta apatía por impotencia muscular que la dolencia origina, hemos de rechazar la general creencia de que sólo por idiosincrasia es el labriego de Puerto Rico indolente, cuando no hay sobre la tierra hombre que la trabaje como él, con este agotamiento de energías, 2 millones de glóbulos rojos, y 20 á 30% de hemoglobina.

Leichtenstern, ha encontrado comunmente dolor en las articulaciones y nosotros lo hemos corroborado, quejándosenos además nuestros pacientes de dolores en los huesos y principalmente en el esternón.

Con respecto á los órganos de la visión, el Dr. W. F. Lippitt nos hizo el obsequio de examinar 10 de nuestros casos y en dos de ellos encontró señales de antiguas hemorragias retinianas. El fondo del ojo está generalmente pálido y las arterias retinianas pequeñas. Muchos autores refieren observaciones de neuro-retinitis. Moulli habla de edema de la papila. Lutz, que el 7 ó el 8% muestran cambios en el globo del ojo. Mensche que la mitad temporal del campo visual está oscurecida. Ceguera nocturna, es un síntoma que pasa sin ser referido por el enfermo, y nosotros lo hemos encontrado en muchos de nuestros casos. Thornhill lo halla en el 9.5% de los suyos; Swan, y Nell en el 24% (!). Los casos especiales 6 y 29 de Utuado, y 1 de Bayamón, acusaron este síntoma por expontánea manifestación.

Un punto importante de la patología de este aparato, es la gran frecuencia con que en Puerto Rico se padece de cataratas, no solo en personas de edad sino en individuos jóvenes. El Dr. Lippitt, que tiene mucha experiencia en este asunto, nos ha informado de que las tres cuartas partes de sus casos fueron anémicos. A. W. Calhoun (The Ophthalmic Record, New Series, Vol XII, 7 April, 1904) llama la atención ó la coincidencia de una doble catarata dura, un año después de haberse desarrollado la uncinariasis. Uno de sus casos fué el de un muchacho de 14 años que empezó á sufrir de catarata, ocho meses después de declarada su enfermedad, y otro de 16 años de edad. Úlceras de la córnea también se registran.

Queriendo comprobar nosotros la observación de Stiles acerca de la pupila, hemos apurado nuestras investigaciones, y hemos sí notado su dilatación pero no la *mirada característica* á que él se refiere. Stiles dice, que si se invita al paciente á mirar fijamente al observador, se notará después de un momento variable, según el grado de enfermedad, que las pupilas se dilatan, y los ojos toman una mirada vaga, apareciendo como los de un pescado, los de un cadáver, ó los de aquellos que sufren una profunda intoxicación alcohólica. A nosotros, desgraciadamente, no nos ha sido posible comprobar este dato, habiéndonos expuesto con nuestra insistencia á hipnotizar, en ocasiones, al sujeto de experimentación. Por lo demás, la dilatación pupilar se observa como síntoma general de parásitos intestinales.

Otros síntomas visuales como oscuridad, moscas volantes, etc., son muy comunes.

La temperatura es, en los casos crónicos normal ó sub-normal; pero en los graves la fiebre es síntoma frecuente, atribuyéndola nosotros en muchos de nuestros casos á la invasión bacilar con edema, de que hablaremos oportunamente.

El sistema digestivo no acusa al principio síntomas objetivos como los de la sangre, y el sistema nervioso; por eso pasan desapercibidos para el paciente, y el médico. Solo después de un minucioso interrogatorio, es que el enfermo viene á recordar cómo abrieron la escena de su padecimiento, algunos trastornos gástricos é intestinales.

El apetito es variable; generalmente está aumentado y hay bulimia en los casos medianos é intensos, pero en los últimos períodos de la enfermedad la anorexia es absoluta. Aparte de la clase del alimento en general, el labriego puertorriqueño desea un alimento de bulto, y en ciertos estados del padecimiento le lleva á llenar su estómago. Por esto hay geofagia; no como fuente de infección, como se ha pretendido, sino como síntoma de la enfermedad, ya establecida. Por lo demás, la geofagia ó alotrofagia, como también se ha llamado á esta dolencia, no es solo síntoma de ella, lo es también de la clorosis, se observa en la preñez, y en los que padecen de otros vermes intestinales. Nosotros creímos al principio, que este era un vicio de los niños; pero lo hemos encontrado también en los adultos. Salvo en los niños, la perversión del apetito de ingerir tierra ó lodo no es tan común como la de comer arroz, café, maiz, y vegetales crudos, lo que es llamado por la gente del campo *el vicio.* Tuvimos en el hospital, un viejo mulato que llegó en el peor estado de la enfermedad y, ya mejor, se escapaba de su cama, para ir á distancia de algunos metros de su tienda, á comer tierra. Varias veces de allí le trajeron los enfermeros y otras tantas volvió, hasta que le dimos el alta por incorregible. Después de algún tiempo nos lo encontramos en las calles de Utuado notablemente mejorado.

La lengua es pálida, saburrosa, á veces está parcialmente denudada de su epitelio, y aparece más roja. Un síntoma, mencionado ya, es la presencia de dos cintas cenicientas, á uno y otro lado de la línea media, que semejan la mancha que deja un lápiz que hubiera sido chupado, haciéndole pasar por la lengua. No es un síntoma muy común y cuando se observa, es debido á estancaciones venosas por trastornos circulatorios. Otras manchas pigmentadas se observan con más frecuencia en la lengua y mucosa bucal, que alcanzan tamaños desde dos mm. á cuatro cm., y se encuentran en individuos de raza mestiza. No hemos podido establecer una clara relación entre estas manchas y la enfermedad.

Algunas veces se presenta estomatitis catarral, muy intensa en ciertos casos. También se observa en otros, mucha salivación.

Flatulencia, con opresión de corazón, dependiente de la dispepsia concomitante; náuseas, acompañadas de mareo, debilidad, y tendencia al síncope; vómitos, que aunque raros se presentan, cuando hay marcada dilatación de estómago, son síntomas que adquieren mayor ó menor intensidad en el curso de la dolencia.

El malestar epigástrico es el síntoma subjetivo más marcado de todos los del aparato digestivo. Es muchas veces el solo referido por el paciente. Puede ser una sensación de peso, plenitud, debido á exceso de gases, pero generalmente lo describe como dolor lancinante. Cede en ocasiones con la ingestión de alimentos. Cuando este malestar ó dolor no se presenta en el epigástrio, se puede provocar por presión sobre el hipocondrio derecho. Lutz lo atribuye á las lesiones que el parásito causa en los intestinos, y algunos autores lo hacen coincidir con el coito de los vermes, y con los desprendimientos de un sitio de la mucosa para pasar á otro.

La dilatación de estómago es bastante común. No así la enteralgia que se puede decir es rara.

El meteorismo es frecuente y constituye en los niños ese crónico abombamiento del vientre.

Presentóse en muchos casos ascitis, siendo preciso hacer la punción por las intensas disneas que provoca.

El estreñimiento, por regla general, se observa; pero en los estados de gravedad de la dolencia, alterna con diarrea predominando por último esta. En las heces fecales no se encuentra comunmente, sangre al punto de darle coloración especial como algunos autores pretenden.

Bajo el microscopio comprobamos sangre más frecuentemente que á simple vista.

Tampoco el moco es común, generalmente; lo que se observa es alimento sin digerir. Cristales de Charcot-Leyden son muy frecuentes y muchas veces se encuentran en gran número. Ellos dan motivo á sospechar los óvulos de uncinaria, aunque tambien estos cristales se hallan acompañando á otros parásitos intestinales. No hemos podido hallar la relación entre su presencia en las heces y la eosinófilia, como algunos casos del Apéndice enseñan.

Los huevos de uncinaria, aquí donde las infecciones son tan intensas, aparecen en los excrementos en número considerable. Veinte ó treinta en un campo de microscopio (⅓ objetivo con 4 ocular, Leitz), y á veces más, es muy corriente encontrar.

Sistema circulatorio. Los trastornos por parte del aparato circulatorio son los que invalidan al uncinariásico. En el capítulo dedicado á la Hematología, estudiados quedan los cambios que se operan en la sangre. Aquí nos ocuparemos de los síntomas que corazón y vasos ofrecen, cuyas alteraciones son las voces de alarma de la enfermedad. *El mal de corazón*, vulgarmente designado así al cortejo sintomático del aparato circulatorio, ha sido también nombre con el que la dolencia se ha conocido.

En los casos ligeros de la enfermedad obsérvase ya, más marcado el choque de punta, haciéndose más ostensible en los casos medianos, para ser reemplazado en los graves por una pulsación tumultuosa en toda la región precordial, que se propaga hasta el epigastrio. En estos casos hay muchas veces cianosis, notándose sobre todo en los labios, y dando á la piel el color lívido característico.

Por la palpación se comprueban estos fenómenos que acusa el centro circulatorio, y percutiendo se observa un aumento del área en el sentido vertical y horizontal, en los casos moderados y marcados.

En tales casos, se perciben los ruidos de soplo presistólico, cuyo punto de auscultación mejor es el del orificio de la arteria pulmonar. Otras veces pueden tomar estos ruidos carácter orgánico, siendo en ocasiones su verdadera naturaleza. Cuando el progreso está muy avanzado y hay gran dilatación, ya no es posible precisarlos.

El impulso cardiaco puede ser notado ligeramente al principio en los vasos del cuello, y cuando la enfermedad progresa se observa, á distancia, una fuerte pulsación de los supra-caviculares. La de las yugulares es notable también pudiéndose percibir el ruido de diablo. Hemos observado pulsaciones de la braquial y sus ramas, con pequeños émbolos correspondientes á las válvulas. Uno de los errores de diagnóstico que frecuentemente ocurren, es el de aneurisma de los vasos del cuello, cuando en éstos la pulsación es intensa y hay dolor en el esternón; haciéndose difícil, muchas veces, excluir la posibilidad de que se trate de otra cosa más, que de un fenómeno circulatorio sin lesión circunscrita.

El dolor precordial, excluido el esternal, que los pacientes acusan, es prolongado y difuso. A veces suave, otras agudo é intenso. No se nota, sin embargo, la irradiación que tiene en la angina de pecho y en el aneurisma.

Las palpitaciones son uno de los síntomas mas frecuentes y constantes. El más ligero esfuerzo puede provocarlas, y en ocasiones se manifiestan dentro del reposo más absoluto.

La disnea no es tan común como las palpitaciones en los casos ligeros, pero es un síntoma corriente en los avanzados. El hidro-pericardias puede observarse en los casos graves.

El pulso está acelerado al principio, fuerte y lleno. Después se hace dícroto, débil y compresible, hasta que en los últimos períodos es rápido, irregular é intermitente. En general su aceleración es consecuencia de la enfermedad, sin que influya en ello para nada la fiebre, que en muchas ocasiones falta.

Mareos, zumbido de oidos, son síntomas frecuentes y constantes sobre todo el último, que atormenta al paciente al extremo de impedirle en ocasiones el sueño. El síncope, lo hemos encontrado en muchos de nuestros enfermos.

Por parte del *sistema respiratorio*, ningún síntoma característico la enfermedad nos ofrece, pues el dolor de pecho es debido á otras causas, y la tos seca, que á veces se observa, es síntoma cardiaco. Sin embargo, es de notar el edema pulmonar y el hidrotórax que, sobre todo, en los casos graves acompaña á la dolencia.

El estado mental del uncinariásico es el de un melancólico. Una tristeza extrema, una indiferencia á todo, una apatía general unida á una falta de esperanza en el mejoramiento de su condicion, es el cuadro que ofrece el desgraciado enfermo.

La soñolencia á veces le invade, y nosotros tuvimos dos casos, en los que persistió tanto este síntoma, que llegamos á sospechar la presencia de los tripanosomas, é hicimos el exámen de la sangre sin resultado positivo.

Dolores de cabeza, desde muy temprano se inician, sobre todo, con localización frontal y temporal, aunque en el vértice y cerebelo no es raro encontrarlos. Las neuralgias son frecuentemente confundidas con los dolores de cabeza, y los musculares, articulares, etc. El delirio nunca lo hemos encontrado.

El reflejo rotuliano está disminuido ó abolido muchas veces. La impotencia en el hombre es frecuente y completa en los casos avanzados y graves. La susceptibilidad al frío es muy comun, así como el hormigueo en las piernas y otras perversiones de la sensibilidad.

Los abortos y partos prematuros que engendran frecuentes endometritis, son dignos de tenerse en cuenta como fenómenos provocados por la enfermedad.

La orina es bastante pálida y su gravedad específica baja. Rara vez se encuentra albúmina. Scheube refiere que de Renzi halla peptonuria y urobilinuria, como consecuencia del efecto hemolítico de la toxina de uncinaria.

El aumento del bazo y del hígado generalmente no se encuentra, y si lo hay, es del hígado, sin que sea ésto síntoma frecuente como algunos autores han dicho.

Con respecto al desarrollo general, la uncinariasis lo afecta de una manera patente. En los niños el empobrecimiento físico y mental es notable. Nosotros hemos visto individuos de 20 años que parecían tener 12. La pubertad se retarda. En los hombres, las partes genitales están atrofiadas muchas veces. En las mujeres, la menstruación que debía por razón del clima presentarse muy temprano, no lo hace hasta los 18 ó 20 años en estas enfermas, y muchas veces es desconocida, dándose el caso de ser madres sin haber visto el flujo catamenial. La mayor parte de los niños nacidos de estas mujeres son raquíticos y con escasas resistencias para cualquier trastorno ó enfermedad.

DIAGNÓSTICO.

Solo al exámen microscópico de las heces, puede confiarse la certeza en el diagnóstico de la uncinariasis. A él hemos acudido en todos nuestros casos, aunque como en Utuado la labor de tres de nosotros, y últimamente cuatro, practicando 300 y 600 exámenes diarios, amén de otros especiales de laboratorio, durante 6 semanas, requiera una gran fuerza de voluntad y una resistencia extraordinaria.

El cuadro siguiente señala el número de exámenes de heces en 4,482 casos.

Tabla 17.—

Examinadas	una vez	339	personas......	339	veces
“	dos veces	668	“	1,336	“
“	tres “	1,011	“	3,033	“
“	cuatro “	862	“	3,448	“
“	cinco “	837	“	4,185	“
“	seis “	392	“	2,352	“
“	siete “	201	“	1,407	“
“	ocho “	110	“	880	“
“	nueve “	44	“	396	“
“	diez “	13	“	130	“
“	once “	3	“	33	“
“	doce “	1	“	12	“
“	trece “	1	“	13	“
		4,482		17,564	

Añádase á esto, sobre 4,500 más de nuestros casos especiales y de los casos de Bayamon, y se llegará á un total de mas de 22,000 exámenes.

Ovulo. El huevo de uncinaria es característico, y con el único que pudiera confundirse es con el de ascarides lumbricoides, cuando estos estan desprovistos de su cáscara. Sin embargo, observando los de ascárides detenidamente se verá que tienen un doble contorno y que la masa vitelina no está separada en claros segmentos como en los de uncinaria.

El huevo de la *uncinaria americana* es “de forma elipsoidea, de 64 á 76 micron. de largo por 36 á 40 micron. de ancho, apareciendo en algunos casos, parcialmente segmentados, desde el útero; en otros casos (raros) contiene un embrión desarrollado, cuando se deposita." (Stiles).

El óvulo de la *uncinaria duodenalis* es: "elipsoideo, de 52 á 60 por 32 micron. y es depuesto en segmentación". Stiles.

Las dos variedades son prácticamente iguales en apariencia, excepto el tamaño. Tienen ambas cáscara anhista, y su contenido finamente granular, de color grisáceo, está generalmente agrupado en masas á segmentos, que varían de cuatro á ocho. La segmentación se encuentra avanzada, cuando el spécimen es de algunas horas. En tales casos, no es raro encontrar el embrión moviéndose dentro de la cáscara, pero no libre; pues los embriones que se encuentran libres, son generalmente de *strongiloides intestinalis.*

Para más detalles sobre este particular, remitimos al lector á los tratados de Zoología, limitándonos á decir que el huevo de uncinaria aparece sin ese tinte amarillento que acompaña, generalmente, á los de otros parásitos intestinales. Puede obtenerse una preparación permanente de esta ova, tiñendo un spécimen muy delgado, con el reactivo de Jenner á cualquiera otra de sus modificaciones.

De 300 á 500 hembras producen cerca de 1,000,000 de huevos al día, que depuestos con las heces se encuentran repartidos en su masa. Se ha tratado de averiguar por el número de huevecillos en ellas, el total de parásitos hembras existentes, y Leichtenstern divide para esto el número de huevos encontrados en un gramo de excremento, por el factor 47. Grassi y Parona proceden mezclando una parte de las heces con tres de agua. Un decígramo de la mezcla (ó sean próximamente tres gotas). lo llevan á un porta-objeto que tiene un espacio cuadriculado capaz á contener 4 milígramos del líquido, y entonces obtienen el número total por la relación de que 20 huevos por milígramo de las heces diluidas, indican 480 hembras. El número de machos con relación á las hembras está en la proporción de 1:3 á 1:4.

Tenemos que llamar la atencion hácia ciertos hechos que hacen que estos cálculos sean erróneos:

1.—El intestino delgado, sitio habitual del parásito, está de ordinario cubierto con espeso moco, y conteniendo este moco, que no se expulsa á veces, muchos de los huevecillos, claro es que el cálculo ha de ser incorrecto. Nosotros hemos observado casos en que la mucosidad era rica en ovas, y la verdadera materia fecal contenía poco número.

2.—Por alguna razón es mucho mas difícil encontrar los huevecillos en los casos de diarrea.

3.—Porque, como se verá en los casos especiales, consignados en el Apéndice, muchos individuos tienen muchos parásitos, á pesar de no aparecer los óvulos es las heces, aparte de las circunstancias en que puede haber nueva infección.

La suspensión de la ovulación se ha visto que ocurre después de administrar los antihelmínticos, transcurriendo en ocasiones bastante tiempo hasta que aparecen los huevecillos en las heces.

Otras veces la suspensión de la ovulación es corta ó dura poco tiempo, pues casos tuvimos en los cuales aparecieron abundantes ovas dos días después de haber sido administrado el timol. En muchos casos la aparición de huevecillos se debe á la madurez sexual de un nuevo grupo de parásitos.

Un hecho, recientemente referido por Dieminger, es que la suspensión de la ovulación se debe á enfermedad del parásito por otras sustancias que no son precisamente anti-helmínticas. Él ha notado que en los bebedores que ha examinado después de copiosas libaciones no ha encontrado los huevecillos, ó si aparecieron fué en escaso número, con relación á los numerosos hallados en días siguientes á la privación de sustancias alcohólicas.

Examinando 21 hombres un Lúnes encontró solamente 4 infectados; el Viernes siguiente halló gran número de huevos en 11 individuos que anteriormente no habían mostrado ninguno. En otra ocasión, observó una gran infección un Sabado, pero el Lúnes siguiente no pudo hallar ni un solo huevecillo, apesar de repetidos exámenes. La razón de este hecho la encuentra en que el Domingo, el sujeto de experimentación había bebido con exceso.

Dieminger hace notar también que la ingestión de macarelas reduce el número de huevecillos en las heces.

Técnica del exámen microscópico de las hecés. Una pequeña cantidad de excremento del tamaño de una cabeza de fósforo, se toma con un palillo de dientes, y se deposita sobre un porta-objeto, comprimiéndola luego con un cubre-objeto grueso, á fin de obtener una capa fina. En estas manipulaciones es conveniente usar dedales de goma como lo hacemos nosotros. Cuando la consistencia del specimen lo requiera, se añadirá un poco de agua; pero la absolutamente necesaria para permitir extenderlo en capa delgada.

La observación se hace mejor con los objetivos $\frac{1}{3}$ ó $\frac{2}{3}$ de Leitz en combinación con el ocular 4. Algunos prefieren el objetivo $\frac{1}{6}$ pero se sabe que con altos aumentos el campo es más reducido y se pierde tiempo en el exámen, mientras que con aumentos no tan fuertes se logra campo mayor y se trabaja con más rapidez. La luz debe graduarse prefiriendo poco iluminado el campo, pues con una gran claridad pasará confundido en la total masa el huevecillo, debido á su trasparencia.

Generalmente en Puerto Rico, uno ó dos minutos bastan para practicar el primer exámen en un individuo sospechoso. En los sucesivos reconocimientos se empleará más tiempo y entonces es conveniente usar una platina mecánica. Cuando en un caso sospechoso el exámen sea negativo, aconséjase sedimentar las heces. Nosotros hemos obtenido buenos resultados utilizando el centrifugador. Si apesar de esto, no se lograra la demostración del óvulo, no hay inconveniente alguno en que, frente al cuadro sintomático completo, se use una dósis de naftol-beta y se reconozcan las heces, decantándolas como aconseja Stiles, hasta encontrar los pequeños vermes. Durante las doce horas siguientes á la administración del último purgante, todas las heces deben ser reconocidas. Es conveniente recordar que si no se emplea un purgante después del anti-helmíntico, los parásitos pueden ser digeridos y no hallarse en los excrementos.

La falta de microscopio no será excusa para dejar de instituir un tratamiento por el naftol-beta que es inofensivo, pues la quinina, por ejemplo, se usa con menos evidencias de paludismo que las que ofrece el cuadro clínico de la uncinariasis.

Si fuera absolutamente imposible examinar los excrementos, la repetición durante cuatro semanas de la dósis primera, modificará el cuadro clínico y probará la presunción hecha.

Sin embargo, este procedimiento no es verdaderamente científico, cuando el microscopio resuelve toda duda permitiendo al médico marchar sobre base segura. Más, éste, puede hallarse en un momento dado sin tal recurso, y no será aventurado que, conociendo la facies de la enfermedad, instituya desde luego el tratamiento. Claro es, que esto no puede ni debe hacerlo más que un médico, porque solo él es capaz de interpretar síntomas, indagar causas, relacionar datos, hacer, en una palabra, un diagnóstico más á menos exacto, pero labor científica al fin de quien sabe lo que es un organismo enfermo; y no ha de caer en las manos pecadoras del curandero, charlatan, é intruso, mejor ó peor disfrazado, que á tontas y á locas pretenda curar la dolencia.

Por lo demás, en todos aquellos casos en que no sea dado sospechar una infección por uncinaria, el uso del microscopio será absolutamente necesario. No hemos de olvidar cómo dentro del cuadro clínico del padecimiento, puede la profunda anemia existente ser debida á otras causas, y cómo expulsando todos los parásitos, las enfermedades orgánicas concomitantes del corazón, hígado, y órganos hematopoyéticos, secuelas de la infección, pueden acarrear un término fatal.

En términos generales, pueden admitirse como originadas por uncinariasis aquí en Puerto Rico, todas aquellas anemias que no tengan una causa claramente definida, y de fácil acceso á la observación clínica; debiendo someterse á una prueba para determinar la presencia ó no de la uncinaria.

El cuadro clínico que autorizará al médico al uso de un antihelmíntico es el siguiente: una historia de dos ó más ataques de mazamorra, (no siempre las erupciones bajo este nombre conocidas por las clases acomodadas); marcada palidez, (tomando la conjuntiva por guía); murmullo hémico; dolor en el epigastrio, con buen apetito y trastornos digestivos; meteorismo; diarrea; palpitación de corazón; mareos; dolor de pecho, sin tos; melancolía; estado mental indiferente ó estúpido.

En estos casos, que son los de nuestro labriego, sospechada la uncinaria debe procederse á su expulsión por una dósis de prueba, pero en aquellos, generalmente de las clases acomodadas, cuya anemia obedece probablemente á otras causas, nunca debe apelarse á tal prueba sin el auxilio de los recursos instrumentales que dá la clínica.

Algunas enfermedades pudieran confundirse con la uncinariasis, y solo haremos mención de las principales.

Malaria. Un exámen de la sangre aclarará el diagnóstico de esta infección, y aunque muchas veces el parásito no se encuentra en la masa circulante, por estar en los órganos internos, nuevos reconocimientos lo evidenciarán. La malaria, generalmente hablando, no es un padecimiento muy común en Puerto Rico, por más que en ciertas localidades, como Salinas, se deje sentir mucho. Hay una tendencia popular á atribuir al paludismo la causa de muchas fiebres, olvidando los trastornos intestinales con autointoxicación, las enteritis, las formas atenuadas ó abortivas de la tifoidea, la filariosis, etc. La caquexia malárica es realmente rara aquí, y como en el Sur de los Estados Unidos se confunde con la uncinariasis, y con otros padecimientos.

Tuberculosis. En los estados incipientes, el exámen microscópico será auxiliar importantísimo del diagnóstico, aunque la anemia en tales casos aun habiendo palidez, no es notable, presentándose sólo, algunas veces, en los procesos avanzados.

Diarrea y disentería. Cuando son crónicas, pueden ocasionar considerable anemia.

Anemia perniciosa. Esta enfermedad es verdaderamente rara aquí. Ninguno de nosotros ha registrado caso alguno. El elevado índice de color ó riqueza globular, y la preponderancia de megaloblastos sobre normoblastos, serán bastante á excluirla.

Pseudo-anemia. Muchas personas en el mejor estado de salud nos solicitaron remedio para su *anemia*, porque estaban *pálidas*. En la generalidad no encontramos absolutamente nada, sino la complexión de raza como se vé en el Sur del Continente; en otros, manifestaciones neurasténicas. La cifra más baja en la hemoglobina de estos individuos fué 85% ó sea el límite inferior de la normal tasa, obtenida con el aparato de von Fleischl. La mayor parte pasaban de 100%.

La natural complexión que hace aparecer muchas veces pálidos los labios, lleva á la idea de que todo el mundo está anémico en Puerto Rico. Es cierto que algunos individuos de otros climas pierden su muy marcado color aquí, pero en otros no ocurre tal cosa, y nosotros nos inclinamos á creer que este fenómeno sea debido más á la acción nerviosa, que á trastorno orgánico.

Stengel dice, "es bien sabido que individuos de una misma familia presentan marcada palidez, sin que tal evidencia de anemia sea comprobada por el exámen físico, ni por el más cuidadoso reconocimiento de su sangre. La explicación de este hecho la encuentra en el estudio de la circulación general."

Sahli halla, en tales anemias aparentes, una deficiente circulación por reducción de la presión sanguínea en la piel. Otras veces, trastornos vaso-motores son los que juegan un papel en este síntoma.

En general, hay enfermedades á las que se les acusa de ocasionar profunda anemia y sin embargo, un exámen de la sangre no lo prueba.

Refiriéndonos otra vez á Stengel vemos que: "practicando el exámen de la sangre en 100 casos de enfermedades del estómago, intestino, corazón, nervios, y aparato pulmonar, con cierto grado de palidez, encontró un término medio de hemoglobina de 74%." Esto es, 30% más que el promedio por nosotros encontrado en los anémicos aquí.

Es de notar que él llama, *marcada anemia* á los casos de 40 á 50% y *moderada* á los de un 50 á 70%.

CURSO, PRONÓSTICO Y COMPLICACIONES.

En casos de infección benigna, en un sujeto joven, de buenas resistencias, cuyo régimen alimenticio es completo y suficiente, un ligero grado de anemia se presenta para desaparecer luego, si nuevas infecciones no vienen á sumarse á la primera.

Tales casos son raros en Puerto Rico, porque el labriego que constituye la masa anémica, es muy pobre y su trabajo lo realiza en los cafetales, en el pequeño cultivo, en las haciendas de caña, donde está constantemente expuesto á sucesivas reinfecciones, que á la postre le invalidan por la cronicidad de su padecimiento. Entonces, ese labriego enfermo es indolente, y habiendo creado una larga familia, no puede traer á su hogar ni el necesario sustento, ni las medicinas que le devuelvan la salud perdida.

Viviendo léjos de poblado, hasta él no llegan los recursos de la Ciencia, y de complicación en complicación la enfermedad primitiva, (la anemia que le quita el color ó le *hincha*) llega á ser el curso de su dolencia tan largo y es tan común un término fatal, que al acabar con su vida entienden que ha sido "de muerte natural."

Se ha dicho que muchas de las muertes registradas por anemia, no fueron producidas por ella. Nosotros podemos asegurar ahora todo lo contrario. El jíbaro sabe mas de su enfermedad, que el educado que le juzga sin conocerla. El labriego muere de *hinchazón* (anasarca) está *descolorío* (anémico) y el cuadro que él muestra, es el mismo que describe cuando hace referencia á la causa que ocasiona la muerte. En tales circunstancias, las muertes se inscriben como producidas por "anemia" pero ¿y aquellas otras que ocasionan los derrames cerebrales, registradas como "perniciosas," las diarreas, disenterías, enfermedades de corazón, etc., que son, en distintos casos, la escena final de la uncinariasis?

Demostraría no conocer el país quien pretendiera negar que esta enfermedad aquí, destruye familias enteras. En los Estados Unidos y Europa la mortalidad debida á ella es excesivamente pequeña. Pero en Puerto Rico es un azote que causa numerosas víctimas todos los años. Nuestra creencia es, que representa el 30% de todas las defunciones, habiendo la Junta Superior de Sanidad registrado un 20 á 30% en años anteriores. Muchos autores que han tratado la enfermedad, se sorprenderon de que alcance aquí un grado tal de mortalidad.

Por los informes publicados en otros países, vemos que las infecciones que estimamos ligeras aquí, son intensas infecciones allá. Como lo esencial en este padecimiento, es el número de parásitos que lleve un individuo más que los otros factores concurrentes, no será extraño que la curación se opere en muchas personas, aún dentro de las condiciones inherentes á su pobreza.

Más, la vuelta á la salud es seguida de nuevas infecciones que tornan á desarrollar los síntomas, restableciendo el cuadro de la dolencia extinguida. Nosotros sabemos que alguna inmunidad confiere un ataque, pero es tal la intensidad de las infecciones en este país, que toda inmunidad por ese medio obtenida, se extingue rápidamente. Así ha ocurrido con algunos de nuestros casos en Bayamón. Y esto continuará mientras los esfuerzos en la educación del pueblo no lleven á este, al conocimiento de la dolencia, á la práctica de los principios de la higiene, y en tanto que no se emprenda una inteligente y enérgica campaña contra la enfermedad, vulgarmente conocida con el nombre de "anemia." No atendida como se merece, seguirá siendo un azote para la raza blanca y mestiza que forman la población de nuestros campos, debilitándola mental, moral, y físicamente hasta llegar á su total anulación como fuerza viva dentro de la colectividad.

Expuestas quedan las causas por la mayoría estimadas como generadoras del proceso morboso, y que admitimos sólo como concurrentes á agravarlo, deduciendo del conjunto que el mejoramiento del labriego en lo que á su alimentación toca, depende muy especialmente de la atención que se preste á la enfermedad que le enerva.

El curso de esta en los casos típicos, queda referido en la sintomatología, y se puede observar con más detalles en muchos de nuestros casos especiales. Gradualmente, la toxiemia se hace más intensa hasta que el paciente extremadamente débil, edematoso, etc., postrado en su hamaca, es la masa informe que da señales de vida por la respiración anhelosa que provoca un corazón cansado y ya muy cerca de su total agotamiento. Estos casos, son así traídos en hamaca y el sólo hecho de conducirlos de este modo supone la gravedad del paciente. Anasarca, edema pulmonar, enormes ascitis, dilatación de corazón, hidropericardias, completan el cuadro.

La persistencia en la diarrea en estos casos augura un término fatal así como los síntomas del centro circulatorio.

En ocasiones, las resistencias del sujeto contra la toxina en un grado relativo de infección pueden prevenirle de las formas clínicas intensas, presentándose las formas medianas de anemia con síntomas digestivos y trastornos nerviosos, dentro de períodos de mejoría y empeoramiento de la dolencia. Tales individuos más enfermos que sanos, trabajan un día y tienen forzosamente que descansar una semana.

El pronóstico depende, en términos generales, de la presencia ó ausencia de eosinofilia según dejamos dicho en el capítulo Hematología. Fatal en la preñez, puede provocar abortos, partos prematuros y seguirse la muerte en muchas parturientas. Salvo enfermedad intercurrente, el pronóstico es favorable en los casos ligeros, medianos y aun en los intensos, siempre que infecciones nuevas no ocurran; pero en los grados extremos, aún bajo tratamiento, el resultado es dudoso.

COMPLICACIONES.

Son numerosas; siendo las más frecuentes, gastritis, dilatación de estómago, entero-colitis y disentería (amébica ó Shiga). Edema de los pulmones, dilatación de corazón, ascitis, neurastenia etc., mencionadas en los síntomas se incluyen como tales manifestaciones de uncinariasis.

SECUELAS.

Hay permanentes lesiones de corazón, hígado y riñones (estas últimas registradas por Scheube) debido á degeneraciones grasosas de los órganos. Son notadas endocarditis y esclerosis de la aorta: aneurisma no es muy frecuente aquí. La neurastenia es común: paresias y aguda manía pueden algunas veces observarse. Según algunos autores la leukemia puede ser una secuela de esta enfermedad. Lopez Gaztambide encontró un caso en Arecibo con 145,000 leucocitos por m. m. c. del cual nos envió una excelente preparación.

ENFERMEDADES INTERCURRENTES.

Solo de las mas comunes haremos mención aquí. Otras que fueron observadas en nuestra clínica, aparecen al final de este capítulo.

Fiebre palúdica. Es una complicación importante, pues de seguir puede acarrear fatales consecuencias. El caso 6 (Serie de Utuado, Apéndice) es un ejemplo de esta intercurrencia del paludismo. En India, Giles creyó que kala-azar era malaria asociada á uncinariasis y él refiere que su aparición en un poblado, obliga á sus habitantes á abandonarlo.

En Puerto Rico la forma terciana es la más común, habiendo además encontrado nosotros algunos casos con típicas formas anulares, cuerpos crecientes, variedades de la estivo-autumnal.

En Ponce, uno de nuestros casos curado ya de su uncinariasis sucumbió á consecuencia de un ataque de fiebre malárica perniciosa. Otros médicos registran estas formas perniciosas del paludismo, especialmente en Ponce.

Aunque la malaria no es rara aquí, no es tan común como en otras zonas tropicales que no se consideran especialmente palúdicas. Nosotros hemos observado dos casos de formas semilunares ántes de la actual investigación, pero en los estudios ahora llevados á cabo sólo 16 casos de malaria se registraron; algunos de ellos debido á la variedad estivo-autumnal. Comparativamente no es frecuente en las montañas donde la anemia hace estragos.

Es interesante el resultado obtenido con el tratamiento por el timol en 5 casos complicados con malaria. en los cuales la hemoglobina fué apreciada ántes y después de la administración de la droga.

Tabla 18.—

1.—	Hb.	30%,	Marzo	8	55%,	Abril	25
2.—	"	74%,	"	9	84%,	"	27
3.—	"	42%,	"	16	46%,	"	27
4.—	"	32%,	"	21	70%,	"	28
5.—	"	47%,	"	14	80%,	"	24

La sífilis es relativamente rara entre los habitantes del interior, y no deben confundirse las lesiones ulcerosas resultantes de la mazamorra, con las terciarias sifilíticas.

La tuberculosis, que se padece mucho en la Ciudades y Villas, afortunadamente no es tan frecuente en el campo. Nosotros registramos veinte casos evidentes, aunque pudieron escapársenos las formas incipientes. La uncinariasis crea una prediposición para esta enfermedad, que agrava y adelanta su término fatal. Su concurrencia fué nuestro peor enemigo en el tratamiento de los casos afectados, como puede juzgarse por las muertes anotadas en el Apéndice. Es una forma común de la tuberculosis la invasión al testículo.

Afecciones pseudo-reumáticas. Lo que tal vez tenga alguna importancia en el curso de ciertas dolencias de esta Isla, es la presencia en la sangre de un bacilo por nosotros encontrado. Las referencias de invasión bacilar en la sangre, que hacemos en nuestros casos especiales, se refieren á este micro-organismo. Hallado por el Dr. Gutierrez el 9 de Junio, mientras hacía el cómputo diferencial de los elementos sanguíneos del caso especial número 41, serie de Utuado, fué comprobado este bacilo en distintas preparaciones de sangre y serum, procedentes del sujeto bajo observación. La enferma, pues era una muchacha de 9 á 11 años, presentaba gran edema de los piés, tobillos, y cara, fiebre, y dolores reumatoideos. Un cultivo puro, bajo rigurosa asepsia, se obtuvo en este caso. Despues se hicieron otros cultivos procedentes de individuos que aquejaban parecidos síntomas, aunque no eran anémicos, con resultados positivos. En un caso con 91% de hemoglobina y gran edema (casi anasarca), con fiebre y dolores reumáticos, los mismos bacilos (morfológicamente iguales) se presentaron. En tales casos ni albúmina en la orina se comprobó, ni lesiones orgánicas de corazón se encontraron.

Hemos visto tambien otros casos con infiltraciones localizadas, y febricitantes que han acusado idéntica invasión bacilar.

La Comisión no ha podido hacer un especial estudio de este microorganismo, ni intentar su clasificación. A los laboratorios del Ejército, y del servicio de Marina y Hospitales Marítimos, somos deudores de las atenciones que nos han dispensado ayudándonos en esta labor bacteriológica.

Animales parásitos. La lista siguiente comprende los animales parásitos, encontrados en nuestros casos de Utuado. La mayoría fué determinada por la ova característica, aunque creemos que estos son más comunes que lo que demuestran estas figuras. Bilharziosis comprobada por las ovas del parásito en las heces, es más frecuente de lo que se cree, y no se acompaña comunmente de sangre en las evacuaciones, aunque se ha observado gran cantidad de moco en ellas. En muchos casos altamente infectados con bilharzia, no es fácil encontrar las ovas en algunos períodos y, seguramente, por esa razón pasaron muchos sin que fueran notados. En uno de nuestros casos (caso 42, Apéndice) la fasciola hepática no fué sospechada, pero un sólo parásito fué encontrado en la autopsia por el Dr. González Martínez. Los casos especiales no van en esta lista incluidos.

Tabla 19.—

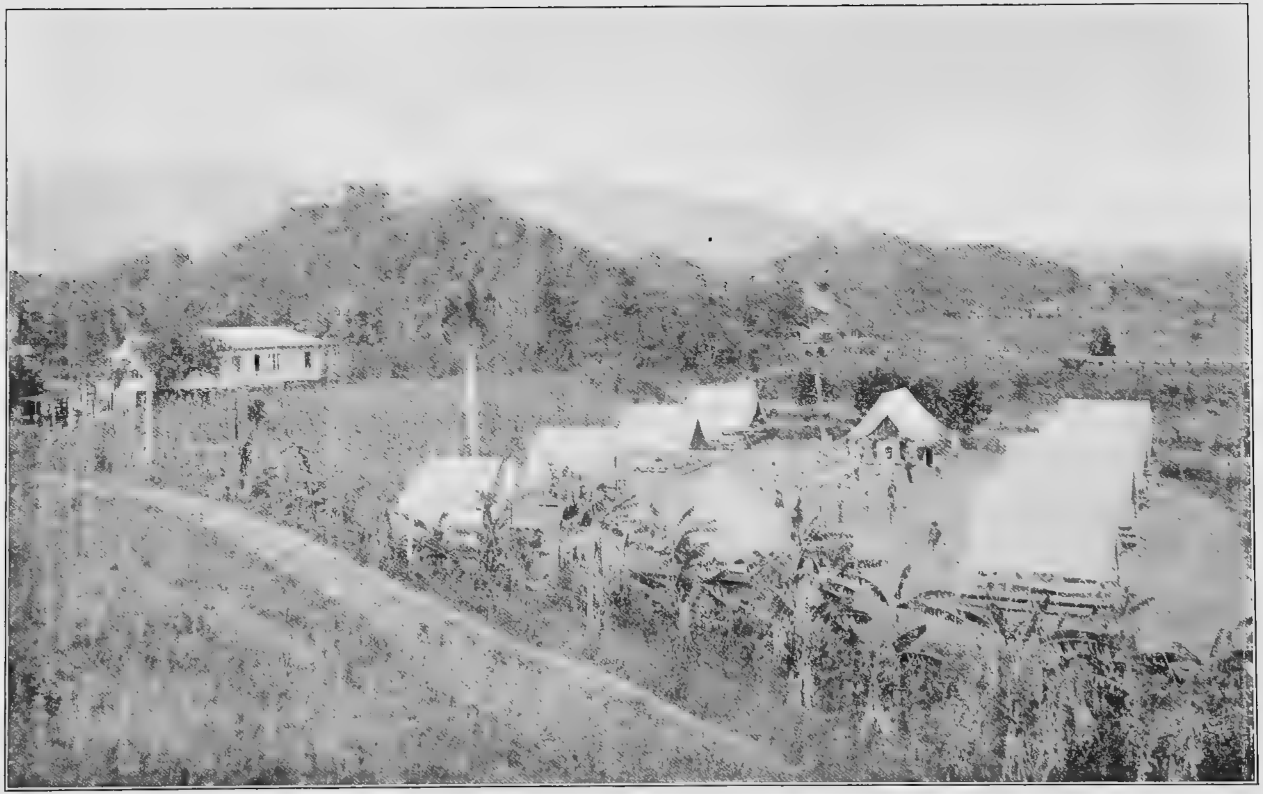
PARÁSITOS.	En combinación con uncinaria solo.	En combinación con uncinaria y otros parásitos.	Total.
Ascaris lumbricoides	1,199	209	1,408
Tricocephalus dispar	155	171	326
Strongyloides intestinalis	25	11	36
Balantidium coli	8	6	14
Bilharzia hematobium	16	5	21
Oxyuris vermicularis	1	2	3
Diplogonoporus grandis	1	0	1
Ascaris canis	0	1	1
Ameba coli	1	2	3
Fasciola hepaticum	2	0	2
Tyroglyphus longior	2	0	2
Tenia saginata	3	0	3
Tenia solium	1	0	2

Los casos siguientes son los que presentaron afección intercurrente.

Tabla 20.—

Pelagra	1	Elefantiasis	2	Hemiplegia	1
Pneumonia	1	Ícterus	4	Cálculo renal	1
Laringitis	1	Tonsilitis	1	Sarna	2
Paresias	1	Filariosis	8	Ulcera de estómago	1
Varicela	1	Conjuntivitis	1	Trachoma marcado	2

En un caso de ícterus, los excrementos contenían ova de fasciola hepática y la orina era quilosa debido, esto último, á probable filariosis concomitante.



FIELD HOSPITAL AT UTUADO.

CAMPAMENTO-HOSPITAL EN UTUADO.

TRATAMIENTO.

Con la sola expulsión del parásito se obtiene en muchos casos la completa desaparición de los síntomas, y la reintegración al estado fisiológico. Pero, en otros, la cronicidad de la dolencia ha alterado de tal suerte la organización, que ya no es sólo la expulsión del verme la que hay que promover, sino que se hace preciso echar mano de todos los recursos terapéuticos, para levantar el edificio en ruinas.

De todos los medicamentos usados como vermífugos, tres hasta ahora son los que merecen ser mencionados: el timol, el helecho macho y el naftol-beta.

Timol. Usado primeramente por Bozzolo en 1880, es preferido al helecho macho en los Estados Unidos y en Inglaterra, habiéndolo empleado nosotros, en nuestras investigaciones, casi como único agente.

Nuestra manera de proceder fué la siguiente. La noche anterior al día en que habíamos de usar el vermífugo, administrábamos un purgante salino, generalmente á dosis de 30 gramos; á fin de que, limpio en parte el intestino, actuara más fácilmente el antihelmíntico. A las 7 ú 8 de la mañana del dia señalado, propinábamos 2 gramos de timol finamente pulverizado y encerrado en cápsulas gelatinosas; repetíamos á las dos horas otra dósis igual de la droga, dejando transcurrir otras dos horas para dar, por último, otro purgante salíno de la misma dósis que el primeramente administrado. Tal fué nuestro procedimiento con los pacientes que venían al Dispensario, y llevaban los medicamentos para tomarlos en sus casas. Mas, con los que en el Hospital teníamos, usábamos, en ocasiones, distinta medicación á fin de comparar los efectos de unas y de otras.

Nosotros creemos que la administración del segundo purgante siempre es necesaria, para arrastrar la droga, evitando intoxicaciones. Por esta razón recomendamos también, que no se use ninguna de aquellas sustancias que pudieran ser disolventes del timol como alcohol, glicerina, trementina, cloroformo, aceite, etc.

Muchos de nuestros asíduos visitantes al Dispensario se nos quejaban del efecto del purgante, de los mareos y ardor en el estómago que los medicamentos les producían.

Esta fué indudablemente una de las varias causas, por las cuales 507 pacientes dejaron de venir hasta obtener su curación, aparte de otras razones muy dignas de tener en cuenta como la distancia á que vivían, la pérdida de tiempo que les proporcionaba la concurrencia á nuestra clínica, etc., etc.

No obstante, nosotros preferimos usar el timol á otra droga, porque no creímos que de su administración se derivara daño alguno siempre que se guardaran las debidas precauciones. Dos de los escritores habíanlo usado en varios cientos de casos, en Ponce, sin riesgo alguno. La toxicidad del agente ha sido algo exagerada, y los casos de intoxicación que la literatura registra, han ocurrido por consecuencia de la ingestión de alcohol ó aceite. Nuestra experiencia nos permite asegurar que el timol es una droga bastante inofensiva, siempre que se evite la administración de sustancias que la disuelvan, y no hemos registrado en nuestras estadísticas un solo caso de intoxicación por ella.

Los casos 18, 25 y 76 (véase Apéndice) que perdimos bajo su administración no podemos atribuirlo al medicamento, que cuando más lo que hizo fué actuar sobre una *entero-colitis crónica* ya existente.

Es cierto que la irritación que produce en la mucosa gástrica é intestinal, es objeción atendible contra su uso; pero nuestra práctica no nos ha hecho ver que esto tenga tal importancia, que cree ningún *estado* especial que contraindique su administración. Por lo demás la muerte por el timol se verifica cuando este se absorve, y nuestras observaciones nos han probado que esta absorción no se realiza tan fácilmente. Muchos enfermos, sin prévio interrogatorio, nos han dicho que el último purgante después de haber tomado el timol, no les había hecho efecto alguno, y que habían pasado hasta tres días sin evacuar. Tales individuos no presentaron el menor síntoma de intoxicación, y sus excrementos algunas veces estaban libres de los huevecillos del parásito.

Hemos administrado el timol en el estado de preñéz en once casos. Uno probablemente de dos meses, otro en el tercer mes de embarazo, seis en el quinto, y tres en el sexto. Dos mujeres, en el quinto mes, abortaron; de ellas, una á los seis días después de haber tomado el medicamento. Su estado de enfermedad era tan avanzado que á él y no á la droga puede atribuirse la pérdida del feto. Sin embargo, nosotros creimos prudente abstenernos de administrarla, y muchos casos fueron rehusados por esta circunstancia. Durante la lactancia hemos aplicado también el timol, sin haber observado efectos ni en la madre ni en el niño, y sin que, por otra parte, hubiera habido disminución en la secreción de la leche.

Un paciente á quien la administración de los purgantes sàlinos le provocaba vómitos, se le dió podofilina tolerando bien el tratamiento.

Muchas veces los enfermos solicitaban tomar el timol en agua, y su ingestión así no les causaba vómitos, según decían.

Manson refiere que la intoxicación por esta droga se manifiesta con vértigos, excitación, etc., orina de color oscuro que recuerda los envenenamientos por el ácido carbólico, y Thornhill registra un caso de colapso fatal, debido á la ingestión de una bebida alcohólica después de la segunda dosis de timol. Scheube añade á lo dicho por Manson que en estos casos la temperatura baja, el pulso es muy lento, la respiración difícil, hay sensación de ardor urente en el estómago y exófago, y por último delirio y colapso.

Boycott y Haldane que usaron esta droga en la epidemia de Cornwall, administrando tres dosis sucesivas en cápsulas ó emulsión en el término de dos horas, no registraron ningún efecto desagradable.

Salvo algunos mareos, ardor en el estómago y á veces aumento de debilidad, nosotros no hemos observado, como anteriormente queda dicho, fenómeno alguno de importancia. La excitación, el dolor urente en la uretra, las orinas oscuras, nunca lo hemos presenciado. Casi como única droga fué usado el timol; á todos lo dimos, pues aun los casos mas graves después de un tratamiento preparatorio, lo tomaron. Sin embargo, este medicamento está contraindicado en aquellos casos de debilidad extrema, en el embarazo, en los cardiacos avanzados ó en otras enfermedades orgánicas, en las diarreas crónicas, en la disentería y en el anasarca.

Sandwith, para levantar las fuerzas de sus pacientes muy debilitados, les dá 25 gramos de brandy con cada 2 gramos de timol. No estamos de acuerdo con Sandwith en este punto, y creemos que es preferible llevar por la vía hipodérmica los estimulantes, como whiskey, nitroglicerina, estrignina y digitalina. Así hemos hecho nosotros.

El efecto observado en los edematosos después de la administración de las primeras dósis del medicamento, fué un aumento de sus edemas; pudiendo en casos avanzados, ser un peligro en los del cerebro y pulmones, amén de los que origine una extrema ascitis.

Con respecto á los purgantes usados, así para limpiar el intestino ántes, como para arrastar la droga después, creemos que no es necesario usarlos á tal dósis que produzcan un efecto prolongado. Es más, los casos de extrema debilidad durante la medicación, débense más á la acción purgante, que á la irritativa del timol. Los autores alemanes recomiendan la podofilina como vermicida, dando grandes dósis durante varios días; pero no teniendo nosotros los detalles de este tratamiento, y solo las referencias de la prensa profesional americana, no creimos prudente dar estas dósis á individuos debilitados, cuando teníamos ya seguridad en otro tratamiento. No obstante, nosotros usamos esta sustancia á dósis de tres centígramos, que si hubiese logrado expulsar algunos vermes, hubiese sido considerada eficaz. Uno de sus principales objetos, sin embargo, así como los de los calomelanos es arrastrar la gran cantidad de moco intestinal, que como sabemos, proteje al verme de la acción de los antihelminíticos.

Los casos especiales 54 y 55, recibieron la podofilina sola, y no expulsaron ningún parásito. Asociada á los salinos, y usando el timol, la dimos á dósis de un centígramo á 342 personas, á 418 en dósis de dos y á 1,697 en dósis de tres centrígramos, haciendo un total de 2,457, de las 4,482 tratadas en Utuado. A los adultos, prescribíamos tres centígramos de podofilina, seguidos de una pequeña dósis de sulfato de sosa, la noche ántes del día en que habían de tomar el timol. Nuestros resultados nos permiten colocarla en la misma categoría que las otras drogas purgantes.

La dósis de timol la graduamos, como es natural, de acuerdo con la edad y con el estado de debilidad del paciente, etc. En aquellos casos muy debilitados, fué nuestro sistema administrar 1 ó 2 gramos de la droga con lo que obteníamos la expulsión de algunos vermes, y luego, relativamente mejorado el individuo, dábamos ya la dósis completa. Nosotros no creemos como algunos escritores ingleses, que las dósis altas de timol sean siempre absolutamente necesarias. Es preferible emplear las cortas, que promoverán la expulsión de algunos parásitos mejorando indudablemente al sujeto, que no exponerse á los riesgos de una dósis alta en un organismo profundamente debilitado. Hemos comprobado este hecho diferentes veces observando, los gusanos en las heces, y la mejoría en el enfermo.

Las dósis fraccionadas, sin embargo, no tienen efecto. Con 30 centígramos, por ejemplo, repetidos cada tres ó cuatro horas, no se obtiene el resultado que con el total administrado en 2 dósis con intérvalo de 2 horas.

La cantidad de medicamento que usamos con relacion á la edad, fué la siguiente: ½ gramo para los niños de menos de 5 años; 1 gramo en los de 5 á 10 años; entre 10 y 15, dos gr.; 3 en los de 15 á 20, y 4 de 20 á 60. En individuos mayores de 60 años, 2 á 3 gramos era lo que empleábamos.

La tabla adjunta explica la dósis, la edad y el número de veces en que el medicamento fué administrado en 4,482 casos. Claro es, que en esa relación aparece mayor número de personas que los 4,482, pero esto es debido á que algunos tomaron distintas dósis en distintas veces.

Tabla 21.—

MEDIO GRAMO DE TIMOL.

Edad.	Veces.				Total personas.	Total veces.
	1	2	3	4		
Menos de 5.....	20	3	2	1	26	36

UN GRAMO DE TIMOL.

Edad.	Veces.								Total personas.	Total veces.
	1	2	3	4	5	6	7	8		
Menos de 5..	4	2	1	2					9	19
5 á 9...	83	109	70	40	15	8	6	1	332	844
10 á 14...	69	31	31	19	7				157	335
15 á 59...	4	1							5	6
Total......	160	143	102	61	22	8	6	1	503	1,204

DOS GRAMOS DE TIMOL.

Edad.	Veces.												Total personas.	Total veces.
	1	2	3	4	5	6	7	8	9	10	11	12		
5 á 9........	33	36	27	9	4	3		3					115	284
10 á 14........	132	216	139	69	31	11	6	3					607	1,544
Mas de 14........	40	16	8	9		1							74	138
Total.........	205	268	174	87	35	15	6	6					796	1,966

TRES GRAMOS DE TIMOL.

Edad.	Veces.												Total personas.	Total veces.
	1	2	3	4	5	6	7	8	9	10	11	12		
Menos de 10....	2												2	2
10 á 14....	75	84	42	20	13	6	3			1			244	581
15 á 59....	203	171	107	49	16	8	5	1	1				561	1,242
Mas de 60....	14	19	10	8		1							52	120
Total.........	294	274	159	77	29	15	8	1	1	1			859	1,945

CUATRO GRAMOS DE TIMOL.

Edad.	Veces.												Total personas.	Total veces.
	1	2	3	4	5	6	7	8	9	10	11	12		
Menos de 10......	1												1	1
10 á 14......	7	6	3										16	28
15 á 19......	69	113	77	48	18	7	4	1				1	338	898
20 á 49......	391	560	479	344	135	65	21	16	1				2,012	5,673
50 á 59......	73	53	39	21	12	3	2	1	1				205	489
Mas de 60......	11	7	4	4	2		1			1			30	80
No datada	2	1	2										5	10
Total.........	554	740	604	417	167	75	28	18	2	1		1	2,607	7,179

Del número de dósis empleadas en Bayamón no se hizo esta estadística; pero puede asegurarse que en cada visita llevaron los pacientes su medicina, calculándose haber dado allí más de 2,000 dósis.

La siguiente tabla demuestra el número de veces que el timol fué administrado en 4,482 casos de la série general de Utuado.

La tabla 23 A detalla el número de veces usada la droga. La tabla 23 B el número de veces necesarias para expulsar todas las uncinarias; la tabla 23 C el número de veces en que fué dado sin lograr la expulsión de todas las uncinarias.

Tabla 22.—

	"A"		"B"		"C"	
Número de dosis.	Personas.	Veces.	Personas.	Veces.	Personas.	Veces.
1.............	935	935	1,518	1,518	353	353
2.............	1,334	2,668	1,166	2,332	190	380
3.............	1,011	3,033	518	1,554	133	399
4.............	667	2,668	247	988	88	352
5.............	288	1,440	104	520	44	220
6.............	143	858	47	282	22	132
7......	57	399	19	133	7	49
8.............	29	232	6	48	5	40
9.............	6	54	3	27	2	18
10............	2	20	1	10	0	0
11............	1	11	1	11	0	0
12............	1	12	0	0	0	0
Timol no dado...	8	0	0	0	0	0
Total........	4,482	12,330	3,630	7,423	844	1,943

Respecto á las facilidades de expulsión de la uncinaria americana comparada con la uncinaria duodenalis, nada podemos decir. En San Juan hemos encontrado 2 casos debidos á la especie del viejo mundo, y en nuestros exámenes en Utuado, el menor tamaño de los huevecillos nos indicó que algunos de nuestros pacientes estaban infectados por la uncinaria duodenalis; pero es claro que no podíamos dedicar el tiempo á la comprobación de esta especie. Sin embargo, todos los parásitos que hemos reconocido han mostrado ser de uncinaria americana.

De los 185 casos de Sandwith, el 95+% curó después de 1 á 5 dosis. Casi el mismo resultado es el obtenido por nosotros.

En nuestra clasificación, hemos relacionado el número de dosis necesarias para obtener la curación con la forma clínica de la dolencia. En general el tiempo de curación depende de este último factor.

Leichtenstern y los escritores alemanes de fecha reciente, creen que la infección que data de poco tiempo, es la más difícil de curar debido á la pequeñez del verme que se cubre con el moco intestinal, y se esconde en la mucosa. Dudamos que esto haya podido ocurrir en la generalidad de nuestros casos. Enfermos de infección muy antigua nos ha sido difícil lograr su curación; pero lo mismo nos ha sucedido con otros cuya infección databa de época muy reciente. El enquistamiento de la larva, como en otro lugar hemos indicado, puede hacer que el antihelmíntico sea ineficaz en muchas ocasiones.

La tabla siguiente muestra en grupos de diez, los días empleados en la curación con relación al grado ó forma clínica de la dolencia.

Tabla 23.—

Días.	Ligera.	Mediana.	Intensa.	Total.
1– 9	367	2	0	369
10–19	428	217	2	647
20–29	168	239	54	461
30–39	52	110	75	237
40–49	28	60	88	176
50–59	12	41	68	121
60–69	10	23	34	67
70–79	3	21	25	49
80–89	1	3	16	20
90–99	2	0	2	4
Total	1,071	716	364	2,151

Observamos últimamente que los huevecillos del parásito desaparecían de las heces para volver á aparecer á las dos ó tres semanas y á veces después de un tiempo mayor, lo que indicaba la suspensión de la ovulación por enfermedad del verme ó nuevas infecciones. En vista de esto dábamos la medicación específica aun no encontrando los huevecillos, cuando la tasa de hemoglobina persistía baja, y los síntomas generales no mejoraban. Muchas veces la falta de curación obedece á la suspensión del antihelmíntico, por no aparecer los huevecillos en los excrementos, cuando una dósis de él levantará después rápidamente la hemoglobina. Conociendo esto comprendemos que un 10% de nuestros casos, pudo haber subido más su tanto por ciento de hemoglobina. Apesar de esto 3,964 dosis de timol fueron administradas después de no haber encontrado los huevecillos.

Nosotros administrábamos el timol de semana en semana mientras aparecían los óvulos en las heces: 97.8+% de los individuos que expulsaron todas sus uncinarias usaron de una á cinco veces el medicamento: 41.8+% las expulsaron con una sola dosis: 32.1+% necesitaron dos dosis: 14.2+% en tres: 6.8+% en cuatro y 2.8% fué preciso que recibieran cinco veces.

De 4,474 casos (excluyendo los especiales) que recibieron el timol el 81.1+% expulsó todas sus uncinarias, sustrayendo los 507 individuos que dejaron de volver ó los que cesaron de venir después de haber tomado los medicamentos dos ó más veces; pues sin ellos hubiera sido un 91.5+%. Según esto el 68.6+% curó en menos de 30 días si bien es verdad que dos terceras partes de ellos eran casos ligeros: 93.4+% de los casos moderados necesitaron dos meses, y 68.4+% de estos curaron en un mes: el 15+% de los casos marcados necesitó menos de 30 días para efectuar su curación, 63+% de ellos se curaron entre 30 y 59 días y 21+% entre 60 y 100.

Creemos que no es necesario usar mas de 4 gramos de timol, y que por lo menos debe trascurrir una semana ántes de repetirlo, por la tendencia que tiene la droga á irritar la mucosa intestinal.

Manson somete al paciente á una dieta líquida por uno ó dos días, lo que es innecesario é impracticable aquí, especialmente cuando se trata de individuos sumamente debilitados.

Él dá 3 ó 4 dósis de 10 á 30 granos de timol bien triturado, de una en una hora.

Mosler y Peiper administran de dos á diez gramos de timol distribuido en dos ó seis dosis durante el dia, indicando que un poco de brandy diluido puede tomarse después.

El método de Lutz es el siguiente: despues de una ligera comida á las 11 a. m. dá ½ gramo de calomel y 2 gramos de sen, dividido en 4 dosis una cada hora, dejando tomar después un alimento ligero. Al siguiente día administra 2 gramos de timol que repite dos ó tres veces con intérvalo de 2 horas, pudiendo tomar ántes un poco de café ó caldo.

Después del antihelmíntico recomienda un purgante ligero. Es de notar que él aconseja también el uso de la podofilina sola ó acompañada de la jalapa y belladona como purgante prévio.

Scheube usa 4 ú 8 gramos de timol en cápsulas ó en obleas, dividiendo esta cantidad en 4 dósis, y administrando una cada hora y media. Él vé en el aceite de castor un peligroso purgante para usarlo después del timol. Este autor espera 12 horas después del vermífugo para dar el segundo purgante.

Leichtenstern dá 2 ó 3 dósis de á 2 gramos cada una, con dos horas de intérvalo, por algunos días, hasta que el paciente toma 20 gramos; pero él prefiere el extracto de helecho macho. Giles usa el timol en 3 dósis de 25 granos cada una por la mañana, medio día y tarde. Hace una fuerte solución de 1 á 4 de alcohol y cada dósis la vierte en 2 onzas de agua. Él considera inecesario el purgante prévio. Este método no es reconmendable por muchas razones.

Helecho macho. La oficial Oleoresina Aspidii (U. S.) es un violento veneno que á dósis toxica según H. C. Wood (Therapeutics, Its Principles and Practice, 11th Edition, 1900.) produce vómitos intensos, diarrea, debilidad general, temblor y calambre en las extremidades, aumento en los reflejos, amaurosis y finalmente en algunos casos, violentas convulsiones tetánicas, con opistótonos, estupor, coma y colapso. La ictericia aparece algunas veces 6 dracmas (22. 2 gramos) ha producido en ocasiones, fatales resultados á un adulto. Trastornos de los sentidos no dejan de ser frecuentes en la intoxicación por el Aspidium, como ambliopía ó completa amaurosis. Uno ó ambos ojos pueden afectarse y la ceguera por atrofia gris puede ser permanente. Según Quirll el resultado fatal es debido en parte á la violenta irritación gastro-intestinal, y en parte á la acción sobre el sistema nervioso. Sin embargo, estos síntomas rara vez se observan. Es un remedio muy antiguo, eficaz antihelmíntico para las ténias y últimamente aplicado en la uncinariasis. En Europa es usado casi exclusivamente, prefiriéndolo al timol por que lo creen menos peligroso y de efecto más seguro. Es droga que está con frecueneia adulterada, de variable poder, más costosa que el timol, y con facilidad se descompone en estos climas.

Bruns registra 4 casos de ceguera debido al helecho macho, pero él la usó en un gran número de indivios y no obtuvo resultados desagradables. De 21,612 casos tratados en Westfalia él refiere que el 1½% no expulsó todos los parásitos. Solamente del 15 al 30% necesitaron segunda dosis para expulsarlos; pero añade que los huevecillos aparecieron en un buen número de personas cuatro semanas después. Bruns reconoce la variabilidad en el poder de la droga.

Ténholt dice que el 4.2% de sus casos necesitaron más de tres dósis para efectuar su curación.

Lambinet da 30 centígramos de jalapa y calomel la noche ántes, y al dia siguiente administra; extracto de helecho macho 4, cloroformo 3, aceite de ricino 40, en dos dósis con una hora de intérvalo, y al dia siguiente las hace repetir.

Töth indica que Goldmann en Brennberg, usaba de 8 á 16 gramos de helecho precedido por calomel, administrando la mitad de esta cantidad en dósis repetidas cada cinco minutos, si no notaba síntomas de intoxicación; y la otra mitad la daba con intérvalos de diez minutos hasta que el total era ingerido. Después daba jalapa y calomel. Pasados algunos dias, hacía tomar 10 gramos de aceite de trementina rectificado, para completar el efecto vermífugo.

El propio tratamiento de Töth es la administración de 3 á 5 gramos de helecho con una copa de licor cada dia, durante cuatro á cinco. Él trató 300 casos de esta manera; pero resultó en 2 á 3% ictericia y catarro intestinal.

Dieminger no considera necesario el purgante preparatorio. No ha observado casos de colapso, pero sí ícterus, gastritis, y gastro-enteritis como resultado de este tratamiento.

Los autores italianos han dado 20 y 40 gramos de extracto etéreo de helecho macho sin riesgo alguno (Mosler y Peiper), por lo que cree Scheube que las plantas italianas sean más débiles que las alemanas.

Leichtenstern dice que de 10 gramos no se debe pasar, y Scheube llama la atención al peligro de la absorción cuando se usa el aceite de castor.

En nuestra práctica cuando usamos el helecho macho, lo hacíamos preceder de 0.13 de calomel y 0.03 de podofilina la noche anterior. A la mañana siguiente dabamos 8 gramos de extracto etéreo y al medio día hacíamos tomar un ligero purgante salino. Algunas veces fueron expulsados parásitos que se resistían al timol, otras veces no.

Por regla general hay más mareos y náuseas, y los enfermos se sienten más debilitados con este vermífugo que con el timol. No obstante uno y otro son eficaces, y muchas veces esos fenómenos generales dependen de condiciones individuales. Es, sin embargo, evidente que el helecho macho es inferior al timol aquí en Puerto Rico, y que debe usarse en aquellos casos en que esta última droga no diera resultado.

Naftol-beta. Este es, indudablemente, un medicamento de gran valor en la uncinariasis, que eclipsará tal vez á los anteriores.

Nosotros hemos logrado expulsar cerca de 1,000 uncinarias con una sola dosis, y hemos obtenido en algunos casos completa curación. Pero nuestra experiencia no ha sido larga, porque después de cerrados nuestros trabajos en el campo llegó á nuestras manos el importante artículo de Bentley. Este observador dice (en el "Indian Medical Gazette," Calcutta, April, 1904, vol. 29, No. 4) que ha abandonado el uso del timol por el naftol-beta, con el que ha obtenido en muchos miles de casos resultados excelentes. Adminístralo de igual modo que el timol, aunque en dosis de 2 gr. en vez de las 4 á que se usa aquel. Y añade "por este medio me ha sido dado expulsar en buen número de casos, 500 y 1000 vermes de una vez." Consigna además que esta droga es de menos precio que el timol.

El descubrimiento de Bentley marca una de las eras más importantes en la terapéutica de la uncinariasis, é indudablemente el naftol-beta tendrá la preferencia sobre el timol, en tanto no se encuentre ser ménos eficaz.

Los siguientes medicamentos han sido mencionados por distintos escritores.

Mosler y Peiper, y otros, el jugo de ficus dolaria en dosis de 3 á 6 cucharaditas.

Powell recomienda los polvos de la nuez areca; pero Ozzard dice que estos no le han dado resultado alguno.

Bentley clasifica el valor de las drogas usadas según este orden. 1°, naftol.—2°, timol.—3°, nuez de areca.—4°, helecho macho.

Una preparación que ha dado buenos resultados es la conocida con el nombre de preparado de Jorissen que se compone de terpina 0.5 gr., azufre sublimado 2 gr., polvos de condurango 1 gr.

Goldmann indica una infusión de la corteza de la acacia antihelmíntica, pero como ésta viene solamente de Abisinia, es difícil todavía su obtención.

Braddon, de Straits Settlements, recomienda el aceite de menta; Schokmann, de Ceilan, 30 gotas de kerosene en mucílago dos veces al dia; Macdonald, el carbonato de guayacol; J. E. Poole, de Maramaibo, Guayana Holandesa, el timotal (carbonato de timol).

Tratamiento ferruginoso. Una prueba sorprendente se obtuvo cuando se hizo la división de los curados, en los que tomaron hierro ó nó. La tabla siguiente señala el número de individuos que curaron sin haber usado ningún ferruginoso.

Los marciales no se daban á ningún paciente en su primer visita, excepto en aquellos casos muy marcados de la enfermedad, y si la mejoría era evidente, nunca los recibían. Cuando la regeneración de fuerzas se hacía con lentitud, entonces administrábamos los ferruginosos, ya en forma de píldoras de Blaud, Vallet ó Blancard, á dósis de 3 á 6 por día. El Peptomangan, (Gude) de cuyo excelente preparado nos envió M. J. Breitenbach Co., de New York, un importante lote para nuestros enfermos, fué usado principalmente en los casos especiales.

Tabla 23.—

Dias.	Ligera.	Mediana.	Intensa.	Total.
1– 9	0	0	0	0
10–19	15	8	2	25
20–29	74	106	24	204
30–39	30	83	56	169
40–49	26	50	73	149
50–59	11	35	50	96
60–69	10	22	33	65
70–79	3	20	24	47
80–89	1	2	16	19
90–99	2	0	2	4
Total	172	326	280	778

Los casos que no recibieron medicación ferruginosa, fueron los siguientes:

Tabla 24.—

Dias.	Ligera.	Mediana.	Intensa.	Total.
1– 9	367	2	0	369
10–19	413	209	0	622
20–29	94	133	30	257
30–39	22	27	19	68
40–49	2	10	15	27
50–59	1	6	18	25
60–69	0	1	1	2
70–79	0	1	1	2
80–89	0	1	0	1
90–99	0	0	0	0
Total	899	390	84	1,373

Como se observará en las tablas los casos ligeros fácilmente curaron sin recibir preparados de hierro, pero entre estos y los que los recibieron, la diferencia es mayor que entre todos los demás grupos. En todos los casos en que la mejoría se hacía esperar, sin distinción de tipo, fueron administrados los marciales; pero no por esto recobraron con mayor rapidez sus fuerzas, en relación con los que no los usaron. El progreso en la curación, en términos generales, depende más de las reservas naturales del paciente, y de la rapidez en la expulsión de sus parásitos, que de un tratamiento reconstituyente. No nos es fácil, por tanto, juzgar del valor de las distintas preparaciones ferruginosas, aún cuando en muchos pacientes con las píldoras de Blaud obtuvimos favorables resultados.

En una serie de 22 casos elegidos entre distintas formas de la enfermedad, y diferentes edades de los pacientes, no administramos ninguna medicación reconstituyente, á fin de observar solo el efecto de la expulsión de la uncinaria. El resultado fué el siguiente. Curados, siete (31.81+%); prácticamente curados, dos (9.09+%); mejorados, diez (45.45+%); no mejorados, tres (13.63+%). Su término medio de hemoglobina á la entrada, fué 41.59+ y, al final 64.67+. Este tanto por ciento habla muy favorable del resultado general.

No obstante, las preparaciones ferruginosas son convenientes en ciertos casos graves, aunque, desde luego, en esta enfermedad no será positiva ninguna terapéutica que no emplee los antihelmínticos.

RESULTADOS DEL TRATAMIENTO.

La clasificación siguiente demuestra el resultado obtenido en Bayamón.

Tabla 25.—

Curados	52	personas.
Prácticamente curados	91	"
Mejorados	228	"
No mejorados	52	"
Sin datos	522	"
Fallecidos	2	"
Total	947	

Los 4,482 pacientes de Utuado formaron la serie general, en la que solo los datos principales fueron registrados. El resumen de resultados, según la forma clínica de estos casos, es el siguiente:

Table 26.—

Resultado.	Ligera.	Mediana.	Intensa.	Total.
Curados	1,071	716	364	2,151
Prácticamente curados	13	51	209	273
Mejorados	61	170	1,264	1,495
No mejorados	1	8	25	34
Fallecidos	2	2	18	22
De una sola visita	35	55	134	224
Que abandonaron el tratamiento.	38	59	186	283
Total	1,221	1,061	2,200	4,482

Los 61 casos especiales según la forma clínica de la enfermedad van registrados en la tabla que sigue:

Tabla 27.—

Resultado.	Ligera.	Mediana.	Intensa.	Total.
Curados	1	1	40	42
Prácticamente curados	0	1	12	13
Mejorados	0	0	3	3
Fallecidos	0	0	3	3
Total	1	2	58	61

Resumen general de los 5,490 casos tratados:

Tabla 28.—

Curados	2,244
Prácticamente curados	377
Mejorados	1,727
No datados	522
De una sola visita	224
Que abandonaron el tratamiento	283
No mejorados	86
Fallecidos	27
	5,490

Uno de los fallecidos se excluyó de esta lista porque fué tratado luego que la Comisión había cerrado sus trabajos clínicos en el campo de la investigación.

En la anterior clasificación hemos llamado:

Curados: A aquellos en quienes desaparecieron todos los síntomas de la enfermedad y las ovas de los parásitos en sus heces, habiendo levantado su hemoglobina á 85% ó más, comprobada con el hemoglobinómetro de von Fleischl. Esta clase da el 40.8+ % del número total. El tanto por ciento de este grupo en Utuado fué de 48.+.

Prácticamente curados: En esta clasificación comprendemos los mismos casos de la anterior, con la sola diferencia de variar su hemoglobina entre 70 y 85%. Este grupo da un 6.8+% del número total. Añadiendo esta cifra al tanto por ciento de los curados tendríamos un 47.6+% del total número y un 54+% para los de Utuado.

Mejorados: Los que su nombre indica y cuyo término medio por ciento fué 31.4+ del otal. En Utuado el promedio alcanzó al 32.+ de los casos.

El término medio de los curados, los prácticamente curados y los mejorados alcanza en el total número á 79%. En los casos de Utuado subió á 87%.

No mejorados: Este grupo comprende el 1.5+% del número total, y las defunciones están representadas por un 0.5—%.

Aquellos que sólo vinieron una vez y no volvieron, ó los que después de dos ó más veces dejaron de asistir al Dispensario, alcanzan un número relativamente corto, y está representado por el 18.+% de la cifra total. En tales personas, claro es que, no tuvimos oportunidad de completar el tratamiento ni precisar los resultados.

La mayoría de estos casos, estuvieron bajo tratamiento desde 2 semanas á dos meses, excluyendo desde luego los últimamente referidos.

La diferencia entre el resultado obtenido en Bayamón comparado con el de Utuado, la encontraremos en que los casos de la primera población muy pocos estuvieron más de tres semanas en tratamiento. Muchos seguramente hubieran curado con tres semanas más de asistencia. Los de los grupos de *mejorados* y *prácticamente curados* lo están ya curados (salvo los casos de reinfección), así como los 522 *no datados.* Nuestra permanencia en Bayamón fué de siete semanas. En Utuado estuvimos catorce.

El número de visitas á nuestra clínica en Utuado, se ha registrado en el siguiente cuadro:

Tabla 29.—

Una visita	331	personas	331	veces.
Dos visitas	664	"	1,338	"
Tres "	955	"	2,865	"
Cuatro "	861	"	3,444	"
Cinco "	667	"	3,335	"
Seis "	446	"	2,676	"
Siete "	265	"	1,855	"
Ocho "	166	"	1,328	"
Nueve "	84	"	756	"
Diez "	29	"	290	"
Once "	11	"	121	"
Doce "	1	"	12	"
Trece "	0	"	0	"
Catorce "	2	"	28	"
Total	4,482	personas	18,369	veces.

La tasa de hemoglobina en los casos *curados, prácticamente curados* y 578 de los *mejorados* en Utuado, no incluyendo los casos especiales, es la siguiente:

Tabla 30.—Curados.

Entre 85 y 89	726	personas.
“ 90 “ 94	411	“
“ 95 “ 99	258	“
“ 100 “ 109	426	“
Más de 110	330	“
Total	2,151	personas.

Tabla 31.—Prácticamente curados.

53% *	1	persona	77%	7	personas.
70%	57	personas	78%	17	“
71%	8	“	79%	6	“
72%	20	“	80%	28	“
73%	21	“	81%	6	“
74%	13	“	82%	10	“
75%	41	“	83%	3	“
76%	17	“	Hb. no datada.	18	“
			Total	273	personas.

Tabla 32.—Mejorados (578 casos).

Entre 20 y 29%	3	personas.
“ 30 “ 39%	38	“
“ 40 “ 44%	36	“
“ 45 “ 49%	55	“
“ 50 “ 54%	92	“
“ 55 “ 59%	106	“
“ 60 “ 64%	141	“
“ 65 “ 69%	107	“
Total	578	personas.

Clasificación de los otros casos de esta serie, en relación con su tipo clínico:

Tabla 33.—Que nunca volvieron.

Casos ligeros	35	personas.
“ medianos	55	“
“ intensos	134	“
Total	224	personas.

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* Este paciente con solo 53% Hb. tiene buen color y se siente perfectamente bien.

Tabla 34.—Que dejaron de volver.

Casos ligeros	38	personas.
" medianos	59	"
" intensos	186	"
Total	283	personas.

Tabla 35.—Fallecieron.

Casos ligeros	2	personas.
" medianos	2	"
" intensos	18	"
Total	22	personas.

Los no mejorados y 917 de los mejorados no fueron clasificados.

Aunque los datos anteriores demuestran el éxito del tratamiento por la expulsión del parásito, la impresión favorable sería mayor si se siguiera personalmente la marcha de la convalecencia.

El resultado del tratamiento en los niños se ha observado muy pronto sin especiales cuidados ni solícitas atenciones.

En general los sujetos jóvenes y los que están en mitad de la vida, recobran pronto la salud, y es curioso observar en ellos como desde la primera dosis de timol sienten la mejoría. Esta es, sin duda, una de las razones por las cuales fueron consecuentes con el tratamiento.

En los ancianos y en aquellas personas por largo tiempo anémicas y debilitadas por otras causas, la convalecencia es lenta debido á que la regeneración de la sangre es pobre. Sin embargo, nosotros hemos observado casos en que habíamos perdido toda esperanza después de seis ó siete dósis de timol, que recobraron por completo su salud luego. Cuando la alimentación es deficiente en estos casos, se hace difícil la mejoría, y algunos de los nuestros no curados corresponden á este grupo.

Otro elemento hay que tener en cuenta, y es la posibilidad de la persistencia de muy pocos vermes, cuyos huevecillos no aparezcan en las heces.

Refiriéndonos al resultado obtenido por algunos de nuestros distinguidos compañeros de profesión, mencionaremos un importante caso que el Dr. Francisco Goenaga, Director del Manicomio Insular, nos ha comunicado.

C. P., mujer: loca, acusada de homicidio: ingresó en el Manicomio el 19 de Noviembre de 1902, maniaca con alucinaciones y en un estado de anemia muy profunda. Poco á poco los ferruginosos, arsenicales, y otros tónicos auxiliados de duchas, ejercicio al aire libre, y alimentación apropiada mejoraron su estado mental. Pero la anemia persistía. Entonces fué que ayudado por el distinguido compañero

Dr. D. Pedro del Valle Atiles, la uncinaria duodenalis fué descubierta al microscopio.

Procedió á su expulsión, y con gran sorpresa al cabo de 3 meses se operó una completa regeneración en su sangre y se consolidó su curación mental al mismo tiempo. El 27 de Junio de este año fué dada de alta, habiendo regresado á su casa en Rio Grande después de ser absuelta por la Corte de Distrito.

Aunque no podemos registrar como resultados obtenidos por la Comisión los de muchos de nuestros compañeros, queremos llamar la atención hácia los que dedican sus actividades á este trabajo, como Gaztambide, en Arecibo; González Martínez y Malaret, en Mayagüez; Aguerrevere, en Ponce; Gatell, en Yauco; Cesteros, en Guayama; Pedro del Valle y Ricardo Hernandez, en San Juan, y otros más de quienes no hemos recibido información. La falta de espacio no nos permite incluir sus opiniones é informes, tan cortesmente enviados á la Comisión, y sólo mencionaremos una Memoria que nos presentara el Dr. Agustín Stahl, de Bayamón.

Este ilustrado facultativo, considerado como el Decano de los médicos de la Isla no solo por sus años, sino por su labor científica persistente y provechosa, fué un constante observador de nuestro trabajo, dedicó á él más tarde sus actividades, y obra de sus investigaciones es el importante informe con que honró á la Comisión. Registra en esta Memoria 400 casos tratados en seis meses, y el resúmen de sus observaciones es el siguiente.

Encontró más hombres que mujeres infectados. El uso de agua de pozo y la costumbre de andar descalzos, los menciona como factores en la causa de la infección. La mayoría de sus casos fueron entre 20 y 30 años de edad, y considera que la raza negra posee una positiva inmunidad para la toxina hemolítica.

Él cree que la irregular asistencia en muchos casos, ha obedecido á las largas distancias que tienen que recorrer los enfermos, y atribuye la falta en otros á que encontrándose mejorados no creen necesaria la continuación del tratamiento.

Considera los casos curados cuando su tasa de hemoglobina alcanza á 75% por el hemoglobinómetro de von Fleischl.

Entiende, que una infección benigna no produce anemia en aquellas personas que observan un buen género de vida. Intensas infecciones originan intensas anemias, sin que en ello influya la alimentación; aunque una convalecencia es lenta, si los órganos hematopoyéticos están exhaustos. Afirma, que la uncinaria, y no la pobreza, solo es la causa determinante de la anemia en Puerto Rico. En muchos que ha creído sin anemia, ha encontrado su tasa de hemoglobina, por bajo de la normal.

Considera de 20 á 150 días el término del tratamiento, mencionando el hecho que á la administración de timol ya después de haber desaparecido los huevecillos en las heces, síguese un alza en la hemoglobina.

Y concluye recomendando la continuación de estos trabajos, que se tomen por las autoridades las medidas oportunas, y estableciendo que, está suficientemente probado que el régimen dietético, la higiene, los ferruginosos, quínicos, etc., son ineficaces para combatir la anemia aquí.

OBSERVACIONES.

La necesidad de tener impreso este Informe ántes de la apertura de la Asamblea Legislativa, no nos ha permitido, contra nuestro deseo, emitir en español las historias clínicas, los datos hematológicos, ni las consideraciones acerca de los casos perdidos por muerte, que aparecen, como Apéndice á esta Memoria, en idioma inglés. Confiamos, sin embargo, en que este Apéndice pueda ser fácilmente interpretado por el cuerpo médico de la Isla, y por el de aquellos paises donde el idioma castellano es el oficial; pues hemos procurado hacer concisas las historias y usar el tecnicismo general.

Tampoco nos ha sido posible preparar un Indice de las materias contenidas en este folleto.

A título de aclaración diremos que las abreviaturas empleadas tienen la siguiente significación:

Hb.—Hemoglobina.
E.—Eosinófilos.
P.—Polimorfonucleares neutrófilos.
S. L.—Linfocitos pequeños.
L. L.—Linfocitos grandes.
B.—Basófilos
S. C.—Células de Türck ó de estimulación
My.—Mielocitos.

En cada hoja clínica, bajo el epígrafe tratamiento (treatment), nos referimos principalmente á la medicación anti-helmíntica y ferruginosa, y las cifras separadas por un pequeño guión indican: la primera, la dósis completa de timol (en gramos); y la segunda, la cantidad de sal purgante usada (sulfato de sosa generalmente) en una dósis.

La bibliografía, que habría de ser igual en ambos idiomas se encontrará en la última parte del Apéndice.

APPENDIX.

EXPLANATION.

This appendix contains the case histories with weekly blood records, of 61 special cases at Utuado, a few specially interesting histories from cases seen in Bayamon, and a record of all deaths from whatever cause occurring among our patients since we began our work.

The abbreviation "Hb." signifies hemoglobin; "E.", eosinophiles; "P", polymorphonuclear neutrophiles; "S. L.", small lymphocytes; "L. L.", large lymphocytes; "B.", basophiles; "S. C.", Türck's stimulation cell; "My.", myelocytes. Although not expressed in all cases, Charcot–Leyden crystals were never absent from the feces. The coagulation of the blood was almost always very slow, and the number of degenerated leucocytes was great in practically every case, especially was this true of eosinophiles. The number of leucocytes counted for the differentials was usually 250 but at times reached 500.

These histories had to be condensed into the smallest possible space. For this reason and in order to have a connected account, no separation of objective and subjective signs has been attempted. Hemic murmurs refer to the heart. Although anatomically the abdomen embraces the epigastrium, we have used the former to refer to the lower abdomen and mention the two separately from the great difference in their clinical significance in this disease. "2-15", "4-40", etc., are abbreviations for 2 or 4 grams of thymol and 15 or 40 grams of sodium sulphate before and after taking thymol. In other words, the number preceding the hyphen is the dose of thymol, the number following it the dose of sodium sulphate.

Case 1. J. S. Town of Utuado. Admitted, May 8, 1904. Age, 23; male; white; married. Laborer on coffee estates. States that he has no work on account of illness. Sister died of anemia. Eats usual food of country people. Has severe mazamorra every year at time of rains. Has had much iron and quinine. Well marked pallor; lips very cyanotic; is well developed and well nourished. No edema; pruritus of feet; no atrophy of skin but same is dry and harsh; does not perspire. Little appetite; gastralgia; nausea; no vomiting; flatulence; decided tenderness, abdomen and epigastrium; meteorism; bowels normal; enteralgia; feces, normal color and consistence but says that he has seen blood in his stools; many eggs of uncin., ascaris and tricocephalus. Spleen normal; liver extends to 1 inch below ribs. Suffers greatly from dyspnea. palpitations and pain in region of heart. Pulse 110, strong and full. Heart not enlarged; slight hemic murmur best heard at third left intercostal space. Slight pulsation veins of neck and decided of arteries in neck and supraclavicular regions. Much pain in chest. Much dizziness and tinnitus aurium. Constant frontal and cerebellar headache. Sleepless and cast down. Suffers from fainting spells. Patellar reflex diminished. Intelligence excellent. Complete impotence for from 15 to 20 months. Susceptible to cold. Paresthesia lower limbs decided. Urine, sp. grav. 1017, reaction acid, color amber; nothing abnormal. Tendency to dilatation of pupil. Blurred vision. Muscles flabby, sore and painful. Decided general weakness. Often has slight fever.

Course of case. Uneventful save that in early part of July he was taken with severe pain in abdomen which precipitated an attack of hysteria mayor with all the signs of sudden and severe congestion of the brain. He lay in a trance-like condition for about three hours but recovered completely. For a similar case see case 30. No albumen found in urine.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May 8	33	2,968,000	13,200	16.8	44.8	29.6	8.4	.4	—	—
" 16	36	2,991,040	5,000	22.4	46.4	14.8	15.2	1.2	—	—
" 23	38	3,960,000	5,200	16.4	58.3	9.	16.3	—	—	—
" 30	36	4,384,000	3,200	17.6	37.6	14.	16.	.8	14.	—
June 6	50	4,000,000	9,200	8.6	55.	15.6	6.8	.4	13.6	—
" 13	56	4,541,600	5,200	14.8	47.6	22.4	12.	.8	1.6	.8
" 20	62	4,360,000	9,800	10.8	64.4	14.4	10.	.4	—	—
" 27	67	5,261,600	7,200	8.8	58.4	22.4	10.4	—	—	—
July 4	66	4,152,800	8,800	9.	42.7	36.	11.4	.3	.6	—
" 11	76	6,866,400	6,400	6.	35.6	29.2	27.2	1.2	.8	—
" 18	83	7,635,200	6,200	—	—	—	—	—	—	—
" 25	83	7,035,200	7,400	4.8	58.8	17.2	17.6	1.2	.4	—
August 1	82	5,176,000	4,000	5.6	52.0	24.8	17.2	.4	—	—
" 8	75	5,924,000	5,000	8.4	44.	31.2	15.2	.8	.4	—
" 15	101	5,164,000	7,800	8.8	41.2	37.6	12.	.4	—	—

REMARKS.

May 8. Blood very fluid; coagulation much delayed. Slight poikilocytosis. June 27, many bacilli in blood, Reds seemingly normal. Aug. 1, reds normal; some bacilli.

Treatment. Peptomangan given in intervals between days thymol administered. May 9, 4-40; 16th, ova uncin; 17th, 4-40; 24th, ova uncin; 25th, 4-30; June 2nd, no ova uncin; 19th, ova uncin; 20th, 4-30; 29th, a few ova uncin, some ova tricocephalus and many Charcot-Leyden crystals. One tyroglyphus longior; July 1st, 4-20, preceded by .03 podophyllin; August 8th, no ova uncin; 15th, no ova uncin; 22nd, no ova uncin; 25th, ova uncin; 26th, vomits sod. sulphat so was given effervescent citrate of magnesia before and after thymol 6; Aug. 1st, no ova uncin; 8th, no ova uncin but many ova of bilharzia hematobium; 15th, no ova uncin.

Result. Cured—August 15th. Is now a powerful ruddy man without a trace of his former disease. A little mucus in stools which are loaded with bilharzia eggs.

Case 2. J. R. Barrio, Salto abajo. Admitted as outpatient, May 9. Age, 24; male; white; single; laborer in garden and on coffee estates; weight 135. Seven of his family are suffering from anemia; father died of it. Has been ill twelve years. Food mainly vegetable; rarely eats meat. Has had much mazamorra. Lately has consumed two quarts of an iron tonic, and many patent iron pills. He is very pale but still has a litlle color left in the conjunctivae. Not emaciated and general developement is excellent. A little edema of face and extremities. Ulcer of right leg. Slight atrophy of skin, which is very dry. Rarely perspires. Appetite good; no gastralgia, nausea, or vomiting. Tongue looks as if a pen had been wiped on it; i.e., 2 purplish lines on dorsum. Flatulence; no tenderness abdomen or epigastrium; bowels regular; feces chocolate color, formed, no blood or mucus, many ova of uncinaria and ascaris, and meat fibres. Spleen and liver normal. No dyspnea; palpitations; no pain over heart; pulse 80, dicrotic and compressible. Heart not enlarged. Soft blowing murmur, best heard at 3rd left intercostal space. No pulsation veins. Dizziness; tinnitus aurium; frontal and temporal headache. No sleeplessness; decidedly hypochondriacal. No fainting fits. Patellar reflex almost abolished. Very typical facies. Intelligence good. No impotence. No susceptibility to cold. Has paresthesias feet. Urine normal, sp. grav. 1012. Pupils tend to dilate. Blurred vision. Muscles soft, sore and painful. Much weakness and breathlessness on exertion. Subject to slight fever.

Course of case. Rapid improvement in all symptoms. Never had any food from hospital and, at every visit to clinic, complained of poor food at home.

Diagnosis Chronic uncinariasis, marked case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May	9..........	38	3,968.800	6,000	13.6	62.	18.	4.8	1.6	—	—
"	16..........	38	4,093,280	10,200	18.8	63.2	13.6	3.2	1.2	—	—
"	23..........	37	5,400,000	3,600	18.	66.	9.6	3.6	2.	.8	—
"	30..........	50	5,217,600	18,400	23.5	60.	9.5	4.	1.	1.5	.5
June	6..........	59	6,000,000	10,800	12.4	64.	8.4	6.	.8	8.4	—
"	13..........	66	6,632,000	9,400	11.2	65.6	12.4	7.2	1.2	2.4	—
"	20..........	90	6,301,600	9,200	10.4	72.	10.	5.6	1.6	.4	—
"	27..........	100	6,484,400	22,600	6.8	75.6	9.6	6.8	1.2	—	—
August	5..........	113	—	—	—	—	—	—	—	—	—

REMARKS.

May 9. Blood very fluid and coagulates slowly. Poikilocytosis and polychromatophilia marked. Many microcytes; a few macrocytes. May 23: Reds more normal; 48 normoblasts per cmm. June 6, 43.2 megaloblasts per cmm. June 20. Reds normal.

Treatment. Blaud's pills used in intervals between days thymol administered. May 9th, 4-30; 16th, very few ova uncin.; no ova ascaris; 4-40; 23rd, still a few ova uncin.; much better: 4-30; 30th, still ova uncin; 4-30; a most remarkable improvement in this case; June 6th, many more ova uncin; 4-30; is taking on flesh and feels well; 13th, 4-30; still a few ova uncin.; 20th, no ova uncin.; 29th, no ova uncin.

Result. Cured, June 27th. All signs of disease have disappeared and the man is fat, ruddy and working.

Case 3. M. G. Barrio, Rio Abajo. Admitted, May 9th. Age, 16; male; mulatto; single; has no occupation because of his illness; usually works on coffee estates; weight 95 lbs. Five in family suffer from anemia (we had ocular proof of this as his improvement brought the whole family down as patients); three of family died of anemia. Food, mainly vegetable with codfish, beans, and rice at times. Has suffered much from mazamorra. Has taken much iron. Marked pallor of m. m. and cyanosis of lips. Color of skin gray. Decided emaciation. Is poorly developed. Has had general edema but does not present it now. Has had ulcers in legs. Slight atrophy of skin which is very dry and harsh. Does not perspire. Has large appetite but "vomits all" he eats. Much gastralgia, and nausea: flatulence: tenderness, epigastrium and abdomen; meteorism; constipated; enteralgia; feces, dark yellowish brown, much undigested food, meat-and vegetable fibres, many Charcot—Leyden crystals, a great many ova of uncinaria, a few of ascaris and tricocephalus. Spleen and liver normal. Dyspnea; palpitation and pain over heart; pulse, 80, very weak and compressible. Badly formed chest. No heart murmur. Much pain in chest. Dizziness; roaring in ears keeps him awake at night; frontal and temporal headache; neuralgic pain in head; sleepless. Is very miserable and cast down. Intelligence very limited. Says he is always "frozen" from cold. Paresthesia, legs and feet. Pupils tend to dilate; vision blurred. Muscles flabby, painful, and sore. He is exceedingly weak. Has had fever.

Course. A very marked case of dilated stomach; a ravenous appetite but persistent vomiting. Boy continued, in spite of this, to improve daily. Is an earth eater.

Diagnosis. Chronic uncinariasis. Marked case.

Complication. Dilatation of Stomach.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May 9	25	2,640,000	7,400	9.8	70.7	11.5	7.5	.5	—	—
" 16	29	2,560,000	7,000	8.	71.2	15.6	4.4	.8	—	—
" 23	31	3,040,000	7,200	10.4	64.	13.6	7.6	—	4.4	—
" 30	35	3,208,000	6,400	18.8	64.8	7.6	4.	1.6	3.2	—
June 7	41	3,844,000	6,200	23.2	56.4	7.2	9.2	.8	2.8	.4
" 13	46	4,074,400	6,600	15.6	63.2	16.4	4.	—	.8	—
" 20	59	3,666,400	6,000	9.2	66.8	11.2	10.	2.	.8	—
" 27	59	4,292,800	3,600	16.	56.4	21.2	3.6	.8	2.	—
July 4	84	4,110,400	8,200	16.	57.6	16.8	8.	.8	.8	—
" 11	100	4,582,400	6,000	17.2	56.	18.4	7.6	—	.4	.4
" 18	103	5,048,800	6,800	13.2	51.6	20.8	11.6	1.6	—	1.2

REMARKS.

May 9th. Blood very fluid and coagulates slowly. Slight polychromatophilia and poikilocytosis, many microcytes, June 27. Macrocytosis prevails. Many degenerated leucocytes. Neutrophilic granules stain poorly in many cells. Little poikilocytosis or polychromatophilia. July 4th. Reds apparently normal. 18th. Reds normal. One eosinophilic myelocyte.

Treatment. Peptomangan used in intervals between days thymol administered. May 9th, 4-45; 16th, ova uncin.; 17th, 4-40; 23rd, 4-30; 30th, ova uncin.; 31st, 4-25; June 9th, ova uncin.; 10th, 4-20; 20th, ova uncin.; 21st, 4-20; 27th, no ova uncin; July 2, nitro-muriatic acid, gtt V. t. i. d. for dyspepsia; 6th, few ova uncin; 7th, 4-20; 12th, no ova uncin; 23rd, discharged.

Result. Cured, July 18. All signs of uncinariasis disappeared. Still suffering from dilatation of stomach but not to any great extent. Color good and is strong and active.

Case 4. R. G. V. Barrio, Caguana. Admitted, May 10; age, 35; male; white; single; laborer on coffee estates: Food, rice, beans, codfish, and vegetables. Gives clear history of mazamorra preceding anemia, and he, himself, connects the two. Has had a great variety of iron tonics. Moderate pallor; no emaciation. No edema; general pruritus; atrophy of skin marked; ever since disease began, has failed to perspire. Good appetite; no gastralgia; has nausea and vomiting; flatulence; no tenderness of epigastrium or abdomen; no meteorism; constipated; no enteralgia; feces, black, streaked with yellow, meat and vegetable fibres, no blood or mucus, few ova uncinaria and many Charcot-Leyden crystals. Spleen and liver, normal. Dyspnea; palpitation; no pain in precordium; pulse, 72, strong and full; no heart murmur; no pain in chest. Dizziness; tinnitus aurium; little headache; sleepless; hypochrondriacal; has fainting spells; intelligence, good; impotence (a prominent symptom); reflexes normal, susceptible to cold; paresthesias of legs and feet. Urine normal, sp. g. 1008. No tendency to dilatation of the pupil but blurred vision. Muscles flabby, but no soreness nor pain. Decided weakness.

Course. An uneventful course but a very obstinate case as will be seen from the blood chart.

Diagnosis. Chronic uncinariasis, marked case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May 10	28	2,656,000	9,000	19.6	51.2	21.6	6.8	.8	—	—
" 17	39	3,604,400	7,600	16.8	62.4	11.2	8.8	.8	—	—
" 24	40	4,040,000	8,400	18.	60.4	12.	4.8	.8	4.	—
" 30	44	4,475,520	9,200	25.6	54.8	9.6	7.2	—	2.4	.4
June 7	41	5,066,400	7,200	7.2	60.8	10.8	6.	1.	14.2	—
" 14	44	4,776,000	8,400	15.6	50.	26.8	7.6	—	—	—
" 21	54	4,555,200	9,200	19.6	52.8	20.8	6.	.4	.4	—
" 28	73	4,808,800	4,400	13.2	58.4	22.	5.2	.8	.4	—
July 5	57	4,888,000	7,800	14.4	48.4	28.4	8.4	.4	—	—
" 12	57	5,532,800	7,000	15.2	56.	14.4	14.4	—	—	—
" 19	82	6,720,000	8,200	8.8	68.4	10.4	11.6	.8	—	—
" 26	84	6,035,200	7,600	16.8	61.2	11.2	9.2	1.6	—	—
Aug. 2	90	5,400,000	5,800	20.	53.6	18.	7.6	.8	—	—
" 9	86	5,715,200	4,200	16.	59.2	17.6	6.8	.4	—	—
" 14	100	6,435,200	10,200	24.8	54.4	14.	6.8	—	—	—

REMARKS.

May 10th. Blood very fluid, a tendency which it sustained almost to the last, with slow coagulation; poikilocytosis; polychromatophilia; many macrocytes and microcytes. July 19th. Reds still tend toward macrocytosis but to a less degree.

Treatment. Peptomangan used in intervals.

May 11th, 4-30; 17th, no ova uncin.; 18th, no ova uncin., two specimens examined; 20th, no ova uncin.; 26th, one ovum uncin.; 27th, 4-30; June 2nd, ova uncin.; 3rd, 3-25; 11th, no ova uncin.; 15th, 3-25; 21st, no ova uncin.; 28th, no ova uncin.; July 5, no ova uncin.; 12th, no ova uncin.; 26th, one ovum uncin.; 27th, 4-15, preceded by .03 podophyllin; August 3rd, no ova uncin.

Result. Cured, August 3rd. Rosy color. Every sign of disease has disappeared.

Case 5. M. M. Barrio, Salto arriba. Admitted, June 24; age, 14; female; mulatto; single: country girl; aids in coffee picking. Anemia is the one disease of her family. Food, mainly vegetable. Has had mazamorra. Moderate pasty pallor. Is fat and well developed save that she has not yet menstruated. Edema of face, trunk and lower extremities: general pruritus; no atrophy of skin but great dryness, never perspires. Good appetite; gastralgia; nausea; no vomiting; tongue dark color; flatulence; tenderness epigastrium and abdomen; meteorism; ascites; bowels normal: enteralgia; feces normal save for large number of ova of uncinaria. Spleen and liver enlarged. Dyspnea, palpitation, "pain in heart"; pulse, 72, weak and compressible; heart, hemic murmur. Pain in chest. Dizziness; tinnitus aurium; headache, frontal and temporal; sleep normal; mental condition, very peculiar, a curious half melancholic, half sullen expression of face; intelligence, poor; no fainting spells; patellar reflex diminished. Muscles flabby and painful. Debility. Temperature 37.1.

Course. A very rapid improvement noted, above all in her mental condition. She completely changed her character becoming pleasant and interested in her surroundings.

Diagnosis. Acute uncinariasis, rapidly becoming severe.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June 26	45	4,432,000	7,600	9.6	53.2	28.	8.	1.2	—	—
July 3	47	4,381,600	11,000	13.2	60.8	19.6	6.	.4	—	—
" 10	65	4,901,600	10,000	13.6	51.6	25.2	9.6	—	—	—
" 17	70	5,506,400	6,200	12.8	46.8	27.2	12.4	.8	—	—
" 24	90	5,835,200	9,400	.	40.8	33.2	4.8	.8		—
" 31	105	4,999,600	9,200	18.	58.4	13.2	10.	.4	—	—

REMARKS.

June 26th. Blood fluid and coagulability diminished. Poikilocytosis and slight polychromatophilia. Microcytes predominate over macrocytes. Many bacilli. July 3rd, few bacilli. July 10th, more bacilli than ever. 17th, no bacilli, reds normal.

Treatment. Blaud's pills used in the intervals.

June 27th, 3-20, preceded by .03 of podophyllin. July 5th, one ovum uncin.; 6th, 3-15, preceded by .03 podophyllin; 10th, few ova uncin. and many Charcot-Leyden crystals; 11th, same as on 6th; 17th, no ova uncin. but some larvae of strongyloides intestinalis; 28th, ova uncin.; 29th, 4-10, preceded by .03 podophyllin; 31st, no ova uncin.; August 2nd, no ova uncin. Discharged.

Result. A wonderfully rapid cure. Has gained much in weight and has a fine color.

Case 6. R. G. Barrio, Caniaco. Admitted, May 11th. Age, 22; white; single; laborer in coffee plantations and banana patches. Says he has never lost weight but rather has gained. Brother of case 3. Has been sick for years. Customary country food, but now, codfish is hard to get as whole family are too sick to work. Says, that every time he had three or four cents he purchased "iron powders." Is very pallid with only a little color left in lips and gums. Not emaciated. Has had very marked edema of legs; much mazamorra; general pruritus; has had ulcer of left leg; skin dry and harsh; never perspires; no atrophy of skin. Appetite good; much gastralgia; nausea and vomiting; flatulence; tenderness, abdomen and especially of epigastrium; meteorism; slight ascites; bowels, regular; enteralgia; feces, dark but normal save for eggs of uncinaria and ascaris. Spleen and liver normal. Breathlessness on walking, marked palpitation of heart with pain in precordium; pulse, 85, weak and compressible; heart apparently normal. Marked supraclavicular pulsation. Pain in chest. Dizziness; tinnitus aurium; sleeps "continually." Has fainting spells. Is melancholy and dispirited, with a hopeless, staring expression. Low order of intelligence. Patellar reflexes extinguished. Completely impotent; susceptible to cold, and has paresthesias of legs. Pupils tend to dilate; has obscured vision and night-blindness. Muscles flabby, sore, and painful. Very pronounced weakness.

Course. This was as stubborn a case as we have had. His resistance to the toxin seemed fair, for he became active, and said he felt well, but our belief is that he still has a good number of uncin., perhaps not expelled on account of protection afforded by folds of the m. m. and mucus. He expelled, all together, a tremendous number of parasites.

Diagnosis. Chronic uncinariasis. Marked case.

Complication. Tertian intermittent malarial fever.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May 11..........	22	2,288,000	9,000	20.4	61.2	14.	4.	.4	—	—
" 18..........	22	2,160,000	7,800	12.8	62.	17.6	7.2	.4	—	—
" 25..........	22	2,096,000	3,800	18.8	62.	9.2	8.	.8	1.2	—
June 1..........	30	2,768,000	5,200	12.8	60.4	8.8	11.2	.8	4.4	1.6
" 9..........	45	3,181,600	8,400	14.	65.2	6.0	10.	—	3.6	1.2
" 16..........	37	4,337,600	8,600	18.	54.	18.8	8.	—	.4	.8
" 23..........	45	3,880,000	7,000	11.3	65.4	15.6	7.	.4	—	.3
" 30..........	48	3,928,000	7,600	20.7	63.	10.6	5.4	.3	—	—
July 7..........	57	3,964,000	6,800	17.2	56.	15.6	10.8	.4	—	—
" 14..........	42	4,864,000	5,000	13.6	45.6	26.4	13.2	1.2	—	—
" 21..........	63	4,840,000	7,400	13.1	60.8	16.1	8.4	.8	.8	—
" 28..........	66	5,020,100	9,600	16.	70.	10.8	2.8	.4	—	—
Aug. 4..........	62	3,804,000	9,400	18.5	56.7	15.5	8.5	.8	—	—
" 11..........	68	4,475,200	7,600	21.2	58.8	12.	8.	—	—	—
" 19..........	70	4,728,800	8,600	16.	52.	22.4	9.2	.4	—	—

REMARKS.

May 11th, Blood very fluid, coagulates slowly. High grade of polychromatophilia; poikilocytosis extreme. Macrocytes very numerous. Fewer microcytes. 24.2 normoblasts per cmm. A second differential count was made, and a difference of but one eosinophile and one polymorphonuclear was noted. These specimens were taken separately. June 1st, 20.8 megaloblasts per cmm.; one eosinophilic myelocyte. July 7th, one eosinophilic myelocyte. 14th, Poikilocytosis, polychromatophilia, and macrocytosis marked. One eosinophilic myelocyte. July 28th, Blood more nearly normal.

Treatment. Peptomangan used in the intervals.

May 12th, 4-40; 18th, still enormous number of ova of uncinaria, and a few ova of tricocephalus. Huge number of Charcot-Leyden crystals; 19th, 4-30; 26th, many ova uncin.; 27th, 4-30; June 2nd, still ova uncin.; 3rd, 4-30; 8th, ova uncin.; 10th, 4-30; 17th, ova uncin.; 18th, 4-30; 23rd, no ova uncin.; 30th, no ova uncin.; ova tricocephalus; many Charcot-Leyden crystals; July 7th, ova uncin.; 8th, 4-15, preceded by .03 podophyllin; 11th, typical malarial paroxysm; .324 quinine every 4 hours for 5 days; 14th, no ova uncin.; 21st, no ova uncin.; 28th, no ova uncin.; Aug. 5th, calomel .13, podophyllin .01 followed by extract filix mas 8. This caused expulsion of a few worms; 11th, no ova uncin.; 19th, no ova uncin.

Result. Practically cured, Aug. 19th. Symptoms have disappeared.

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Case 7. R. G. B. Barrio, Caguana. Admitted, May 14. Age, 9; white; male; 4 brothers died of anemia; has been ill two years; has usual country food with codfish and sometimes meat; clear history, given by father, of mazamorra preceding anemia; since illness began, much iron and cod liver oil given him with no result. Extreme pallor, giving him a dirty yellow color. Edema of face and lower extremities. Good appetite but gastralgia and nausea follows; flatulence; abdomen tender; typical "pot-belly"; decided ascites; feces, dark brown, contain abundance of ova of uncinaria, a few ova of ascaris, and Charcot-Leyden crystals. Spleen and liver normal. No dyspnea; palpitation and precordial pain; pulse, 80, weak and compressible; marked hemic murmur. Marked pulsation of jugulars and other vessels in neck. Pain in chest. Dizziness, tinnitus aurium, frontal headache; sleeps well; expression sad and dispirited; patellar reflex abolished; urine, normal, sp. g. 1010. Pupils tend to dilate, and vision obscured. Muscles flabby, and is very weak.

Course. Uneventful. Child gradually became playful, eyes brightened up, and color returned.

`*Diagnosis.* Chronic uncinariasis, severe case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May	14..........	10	2,266,640	7,000	18.4	40.3	34.	6.3	1.	—	—
"	21..........	23	1,648,880	6,600	30.	54.8	10.6	2.8	.8	1.	—
"	28..........	26	2,381,600	10,000	24.4	44.8	23.6	2.	3.2	2.	—
June	4..........	25	5,000,000	8,400	20.8	38.4	17.2	13.2	1.6	8.4	.4
"	12..........	42	4,552,000	11,000	18.8	46.4	12.	10.	4.4	8.4	—
"	18..........	45	4,426,000	18,000	13.6	54.4	20.4	8.	1.2	2.4	—
"	25..........	68	4,224,000	6,200	13.2	50.	30.8	4.	.4	1.6	—
July	2..........	64	5,075,200	9,000	10.8	73.2	10.	4.4	1.2	.4	—
"	9..........	76	6,755,200	15,000	16.	56.8	15.2	10.	1.6	.4	—
"	15..........	103	6,008,000	16,400	21.2	54.8	15.6	4.8	2.	.4	1.2

REMARKS.

May 14th, Blood very fluid, coagulates slowly. Much poikilocytosis and polychromatophilia. Reds are small with pale centers. Polymorphonuclears have very large granules. Aug. 9th, Reds apparently normal. July 15, one eosinophilic myelocyte.

Treatment. Peptomangan used in the intervals. May 15th, 2-20; 22nd, ova uncin.; 23rd, 1-15; 28th, ova uncin.: 29th, 2-15; June 7th, many ova uncin.; 8th, 2-15: 13th, no ova uncin. (two specimens); 18th, ova uncin.; 19th, 2-15; 25th, no ova uncin.; discharged hospital July 3rd. This child was sent home to make room for others. His father warned us that he would have poor food at home. On the 15th he had 103%, the hemoglobin having registered 64% on the day he was discharged from hospital.

Result. Cured, July 15th. He is the picture of a healthy boy with excellent color.

Case 8. **V. B.** Utuado, formerly Guaonico. Admitted, May 11. Age, 40; male; white; married. Laborer on coffee and banana plantations. Had a small farm of his own until he became too sick to work it. Sold it for a small sum and moved to town to obtain treatment for his sickness. Habits, good. Two brothers sick with anemia. Three died from same cause. States that he has had "calenturas," meaning attacks of slight fever. Had mazamorra. Symptoms began about two years ago. Until became too sick to work, had plenty to eat including meat. Has taken treatment at city hospital which gave temporary improvement. Pallor quite marked; no emaciation; well developed; slight edema of face and trunk. No atrophy of skin, but dryness. No perspiration. Good appetite; gastralgia; nausea but no vomiting. Tongue slightly coated. Tenderness over epigastrium and abdomen, flatulence, and ascites. Bowels regular. Feces contain slight amount of mucus and great many ova of uncinaria. Dyspnea on exertion, palpitation, and "pain in heart." Pulse 90; fairly strong. Heart not enlarged. Slight purring murmur over apex with second sound. Slight bronchitis, some cough, and pain in chest. Dizziness; tinnitus aurium; frontal headache; wakefulness; syncope at times. Mental condition, dull and torpid, always lamenting over his poverty and sickness. Patellar tendon reflexes abolished; intelligence fair; impotent; increased susceptibility to heat and cold, and paresthesias. Urine; S. G. 1015, normal. Right eye more dilated than left; blurred vision. Muscles flabby, weak, and sore. Temperature normal.

Course. Constant and steady improvement. Became animated, energetic, and much more intelligent. Proudly boasted that he was now able to support his family and no longer begged.

Was in hospital only 8 days; afterward, outpatient.

Diagnosis. Chronic uncinariasis. Marked case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L-	L. L.	B.	S. C.	My.
May	11..........	34	2,292,800	9,200	4.	74.4	17.2	2.8	1.6	—	—
"	20..........	37	3.456,000	8,800	23¼	53½	8⅓	14¼	⅔	—	—
"	27..........	40	3.648,000	7,800	12.4	62.	6.8	11.6	1.6	4.8	.8
June	3..........	55	4,790,400	7,200	8.	69.2	6.4	13.6	.8	2.	—
"	10..........	45	4,424,000	5,800	11.6	72.8	4.4	8.8	1.6	.4	—
"	17..........	47	5,048,800	8,200	13.6	61.2	8.	13.2	1.6	1.6	—
"	24..........	56	6,724.000	13,600	3.6	76.4	4.4	12.	2.	1.6	—
July	1..........	56	6,124,200	5,400	9.2	65.6	10.8	12.4	2.	—	—
"	8..........	58	5,057,600	10,000	6.8	67.2	10.4	13.2	2-4	—	—
"	15..........	59	4,728,800	6,200	8.4	58.8	15.6	13.6	2.4	1.2	—
"	22..........	60	4,955,200	5,200	8.4	66.	11.6	12.	2.	—	—
"	29..........	75	5,939,600	9,000	16.8	55.6	17.2	7.2	2,8	.4	—
August	5..........	69	5,257,600	5,800	16.	55.2	12;4	15.6	-8	—	—
"	12..........	73	6,270,400	5,800	10.4	72.4	7.2	7.6	2.	—	.4
"	19..........	78	5,786,400	5,600	7.6	72.	6.8	12.4	1.2	—	—

REMARKS.

May 11th. Blood looks normal macroscopically. Poikilocytosis and polychromatophilia. Some macrocytes and many microcytes. June 10th, appearance of blood much improved; 1 eosinophilic myelocyte. 17th, 32.8 normoblasts per cu. mm. 2 eosinophilic myelocytes, July 1st, 21.6 normoblasts per cu. mm.; 15th, Appearance of blood improving; 22th, Blood much improved. August 5th, Blood looks normal; 19th, Basophilic large lymphocyte noted.

Treatment. Peptomangan used in intervals between thymol until July 22, when Bland's pills were substituted.

May 11th, 4-40; 20th, 4-30; 28th, few ova uncin., 4-30; June 3rd, few ova uncin., 4-30; 10th, no ova uncin., 4-30; 17th, no ova uncin.; 24th, no ova uncin.; July 1st, no ova uncin.; 15th, no ova uncin.; 22nd, very few ova uncin., 4-15, preceded by ,03 podophyllin; 29th very few ova uncin.; 4-15 preceded by .03 podophyllin; August 5th, very few ova uncin., 4-15, preceded by .03 podophyllin; 12th, no ova uncin., 4-15, preceded by .03 podophyllin; 19th, brought no specimen of feces.

Result. Practically cured. Symptoms, including heart murmur, have disappeared. Has good color. Feels well and is working.

Case 9. P. M. M. Barrio, Rio Abajo. Admitted, May 12. Age, 11; male; white. All of family have anemia; father and two brothers died of it. Has been four years sick. Usual food of country. Has had mazamorra. Has taken iron tonics. Marked pallor. Not emaciated. Edema of lower extremities. General pruritus. Skin dry. Good appetite; gastralgia; no nausea or vomiting; flatulence; tenderness abdomen; meteorism; feces normal save for many ova of uncinaria, Charcot-Leyden crystals, and ova of tricocephalus and ascaris. Spleen and liver normal. Dyspnea; palpitation; precordial pain; pulse, 102 and weak. Marked systolic hemic murmur, and pulsation vessels of neck. No cough nor pain in chest. Much dizziness and tinnitus aurium; frontal headache; sleep normal. Patellar reflex abolished. Is dispirited and lifeless. Susceptible to cold. Urine, S. G. 1012, normal. Blurred vision. Muscles flabby, painful. Much weakness. Temperature 38°.

Course. Gradual betterment.

Diagnosis. Chronic uncinariasis, severe case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May 12..........	20	2,600,000	6,200	27.6	47.2	13.2	10.4	1.6	—	—
" 19..........	30	2,520,000	5,800	22.4	44.	20.	11.2	2.4	—	—
" 26..........	40	3,288,000	6,000	17.6	42.	25.6	7.6	1.6	5.6	—
June 2..........	41	4,096,000	6,100	13.6	50.8	14.8	7.6	.4	11.2	1.6
" 9..........	41	4,764,000	4,200	8.8	53.2	20.	9.6	.8	6.8	.8
" 16..........	54	4,896,000	4,200	25.2	42.	21.2	5.6	2.4	3.6	—
" 23..........	57	4,496,000	6,800	43.6	20.8	18.8	8.8	1.2	6.8	—
" 30..........	58	5,372,800	7,000	37.2	38.4	15.2	4.8	.4	4.	—
July 7..........	62	4,376,000	7,400	35.6	36.	19.2	2.4	—	6.8	—
" 14..........	68	4,680,000	10,800	34.4	41.6	18.8	1.2	1.6	2.4	—
" 21..........	68	5,216,000	9,600	29.2	42.4	21.6	2.4	.8	3.6	—
" 28..........	87	5,128,000	9,400	26.8	42.4	24.4	4.8	1.2	.4	—
Aug. 4..........	87	5,344,000	10,800	42.4	27.2	20.	4.	2.	4.4	—
" 11..........	90	4,936,000	9,600	34.8	46.4	12.4	4.8	—	1.6	—
" 18..........	103	5,048,000	9,800	28.4	52.4	14.6	4.6	—	—	—

REMARKS.

May 12th. Blood very fluid and coagulates slowly. Poikilocytosis and polychromatophilia. Macrocytes and microcytes. Aug. 18th, Reds steadily improved to normal.

Treatment. Peptomangan used in intervals.

May 14th, 2-15; 19th, ova uncin.; 20th, 2-15; 26th, ova uncin.; 27th, 2-15; June 9th, ova uncin.; 10th, 3-20; 16th, many ova uncin.; 17th, 3-20; 23rd, no ova uncin.; 30th, no ova uncin.; July 8th, no ova uncin.; many Charcot-Leyden crystals; 14th, no ova uncin.; 21st, no ova uncin.; 28th, no ova uncin.; Aug. 4th, no ova uncin.; 5th, stopped Peptomangan and replaced it by Blaud's pills; 11th, no ova uncin.; 15th, discharged from hospital.

Result. Cured, August 18th. Is perfectly well and has good color.

Case 10. P. R. Barrio, Viví Abajo. Admitted, May 12. Age, 20; male; white; unmarried; occupation, bread vendor but was herding cattle when he was taken sick. Habits, good. One brother died of anemia. Ate good food until taken sick, meat formerly, not now. Had mazamorra since disease began, but does not remember previous attacks as he was too young Extremely pale, probably most marked pallor of any case. Is very thin but states that such is his normal condition. Has been pale and sick ever since he can remember. Has taken wines and iron in various forms with only temporary relief. Has never had edema. Has small ulcer on left leg and one on same foot between toes. No atrophy skin, but it is very dry. Appetite, good; gastralgia, at times; no nausea, and rarely vomiting; tongue slightly coated. No flatulence, pain, or tenderness in abdomen. Feces contain a great many ova of uncinaria. Dyspnea; palpitation; no pain about heart. Pulse, 96, weak, dicrotic, compressible. Heart not enlarged; no murmur; marked pulsation in neck and supraclavicular regions. No cough, nor pain in chest. Sleeps fairly well. Mental condition is good. Intelligence good. Expression staring owing to prominence of eyes. Reflexes diminished. Susceptibility to heat and cold increased; paresthesias not marked. Urine, S. G. 1014; normal. No eye symptoms. Muscles weak but not painful or sore.

A very striking case, in which one would expect more symptoms.

Course. Very rapid improvement at first, then slow but steady.

Diagnosis. Chronic uncinariasis, severe case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May	12..........	20	3,195,520	6,400	.8	58.8	17.6	20.8	2.	Not counted.	
“	19..........	28	2,804,000	5,000	4.8	50.8	25.6	16.8	2.	“	“
“	26..........	38	4,075,520	3.400	6.8	56.	14.8	18.	1.2	3.2	—
June	2..........	38	4,626,400	3,800	4.8	62.4	7.6	20.	2.	2.8	.4
“	9..........	41	5,901,600	4,400	4.	53.2	17.2	18.	3.6	4.	—
“	16	46	5,817,600	4,400	7.2	55.2	12.4	15.6	4.	4.4	1.2
“	23..........	49	6,016,000	5,000	8.	64.4	10.8	13.2	2.4	1.2	—
“	30..........	55	5,964,000	6,400	21.2	57.2	12.4	9.2	—	—	—
July	7..........	67	6,466,400	7,600	12.8	58.	19.2	9.2	.8	—	—
“	14..........	76	6,295,200	11,200	9.2	68.8	12.4	8.8	—	.8	—
“	21..........	82	6,017,600	6,600	9.6	54.4	20.4	14.4	.4	.8	—
“	28..........	83	6,364,000	4,400	8.	68.	9.6	14.4	—	—	—
August	4..........	90	6,630,400	8,800	3.2	68.4	14.8	12.8	—	—	.8
“	11..........	104	6,724,000	7,800	1.6	69.6	16.	12.4	.4	—	—

REMARKS.

Extreme poikilocytosis and polychromatophilia. Very few macrocytes, many microcytes. 102.4 normoblast to cu. mm.; 19th, enormous number and size of macrocytes. Microcytes more abundant. Hardly a normal sized cell. Much poikilocytosis and polychromatophilia. 20 megaloblasts and 60 normoblasts per cu. mm.; 26th, many degenerated leucocytes; 40.8 normoblasts to cu. mm.; June 2nd, one eosinophilic myelocyte: June 9th, appearance of blood improving; 16th, still improving. Two eosinophilic myelocytes; 30th, appearance of blood very good, little poikilocytosis and polychromatophilia. Few macrocytes and microcytes; Aug. 14, blood much improved; 28th, reds looks normal.

Treatment. Peptomangan given in intervals.

May 13, 4-40; 19th, many ova uncin.; 20th, 4-30; 26th, many ova uncin.; 27th, 4-25; June 1st, less ova uncin.; 2nd, 4-25; 8th, still ova uncin.; 10th, 4-25; 17th, some ova uncin.; 18th, 4-20; 23rd, no ova uncin.; 30th, no ova uncin.; few Charcot-Leyden crystals: July 28th, no ova uncin.; Aug. 5th, Blaud's pills substituted for Peptomangan; 7th, 4-15, preceded by .03 podophyllin. Stools searched for uncinariæ but none found.

Result. Cured. As markedly rosy as he was formerly pale.

Case 11. J. M. M. Barrio, Roncador. Admitted, May 12. Age, 37; male; white; widower; laborer on coffee estates; sick five years. Food; meat, rice, beans, and vegetables; has had mazamorra; has taken much iron. Pallor very marked: no emaciation; edema of whole body; pruritus; little appetite; gastralgia; flatulence; no nausea nor vomiting; tenderness epigastrium and abdomen; meteorism; feces dark, soft, contain mucus, Charcot-Leyden crystals, and many ova of uncinaria. Dyspnea; palpitation; pain in heart. Pulse, 76, weak and compressible; heart dilated, murmurs marked. Marked pulsation vessels of neck. Pain in chest. Dizziness; tinnitus aurium; frontal headache; patellar reflex abolished; expression sad and hopeless; intelligence good. No impotence; suffers from cold. Urine, sp. gr. 1015, normal. Pupil tends to dilate readily; vision blurred, Muscles flabby. Great weakness.

Course. One of the most susceptible to the toxin we have seen. A very rebellious case. We have reason to believe, from the large number of parasites expelled in the last month, that the few ova in the stools gave little idea of the number of uncinariæ still within.

This patient is suffering from what looks like "Peruvian wart" on left ankle.

Diagnosis. Chronic uncinariasis, severe case.

Complication. "Peruvian wart" (?).

DATE.		Hb.	Red cells.	Lencocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May	12..........	32	2,656,000	6,800	22.	55.6	16.	6.	.4	—	—
"	19..........	22	2,344,000	5,400	16.4	59.2	17.6	6.8	—	—	—
"	26..........	27	2,364,000	6,000	11.6	68.	17.2	2.	—	1.2	—
June	2..........	26	2,915,000	11,000	11.2	68.4	6.8	10.	.8	2.4	.4
"	9..........	31	3,052,800	11,200	14.	53.2	11.6	13.2	1.6	6.4	—
"	16..........	34	3,000,000	7,600	8.4	72.	14.	3.6	.4	1.6	—
"	21..........	38	4,026,400	9,400	7.6	79.	7.	6.	.4	—	—
"	30..........	36	3,504,000	6,800	9.4	75.3	9.7	5.6	—	—	—
July	7..........	48	3,804,000	11,000	6.4	64.8	16.4	12.	.4	—	—
"	14..........	52	4,496,000	11,200	7.2	72.4	8.8	9.2	2.	.4	—
"	24..........	66	3,670,400	9,200	5.6	58.8	14.	20.8	.4	.4	—
"	31..........	60	4,816,000	8,800	6.4	63.2	17.2	12.8	.4	—	—
Aug.	7..........	60	5,600,000	7,400	8.8	59.6	22.	9.2	.4	—	—
"	14..........	80	6,400,000	8,800	13.6	60.	12.	12.4	2.	—	—

REMARKS.

May 12. Blood very fluid and coagulates slowly; poikilocytosis and polychromatophilia; macrocytes and microcytes abundant, 19th, Same as before to extreme grade; 21.6 megaloblasts and 86.4 normoblasts per cmm. 26th, less poikilocytosis, microcytes predominate; 24 megaloblasts and 24 normoblasts per cmm. June 9th, 89.6 megaloblasts, 268.8 normoblasts per cmm. 16th, 30.4 normoblasts per cmm.

Treatment. Peptomangan used in intervals.

May 13th, 4-40; 19th, ova uncin.; 20th, 4-25; 25th, ova uncin.; 26th, 4-25. June 1st, ova uncin.; 2nd, 4-25; 9th, ova uncin.; 10th, 4-30; 30th, ova uncin.; 4-20, with podophyllin .03. July 7th, no ova uncin. but many Charcot-Leyden crystals; 14th, ova uncin.; 15th, 4-20 with .03 podophyllin. He was discharged from hospital June 22nd with Hb. 38% and reached 80% at home.

Result. Practically cured. Aug. 14th. A very different man from what he was May 12th.

Case 12. I. R. Barrio, Viví. Admitted, May 13. Age, 55; female; white; widow: has been a coffee picker; her brother is being treated at our dispensary. Many of family died of anemia. Very poor food. Mazamorra of feet and hands, contracted by washing clothes on bank of a stream. Very extreme pallor; decided emaciation; edema of legs, extreme; petechiæ arms, and legs purpuric in places; some one has attempted to reduce swelling on legs by two enormous blisters which cause her great pain. Decided atrophy of skin with deep furrows in face; skin dry and harsh. Does not perspire. Good appetite, no gastralgia; nausea and vomiting; flatulence; tenderness of abdomen and especially of epigastrium; meteorism; ascites; very constipated; enteralgia. Feces contain many ova of uncinaria. Spleen and liver normal. Dyspnea; palpitation; pain in region of heart. Pulse, 120. Very weak and compressible. Decided heart murmur. Marked pulsation vessels of neck. Constant, racking cough and pain in chest. Much expectoration containing tremendous number bacilli tuberculosis. Dizziness; tinnitus aurium; severe headache and neuralgic pains; sleeplessness. The facial expression of this woman is beyond description. Very hypochondriacal, completely hopeless, and very querulous. Paresthesia of feet. Muscles flabby, sore, and painful. Has evening rise of temperature.

Was brought in a hammock and is in the last stages of uncinariasis and tuberculosis with cavities in both lungs. Her death was momentarily expected.

Course. Improvement slowly took place as time went on. She was so desperately ill that we had to seize upon any favorable day to administer thymol, which she always stood well, feeling better thereafter.

Diagnosis. Chronic uncinariasis, extreme case.

Complication. Advanced pulmonary tuberculosis.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May	13..........	27	2,306,640	6,200	2.	90.	6.4	1.6	—	—	—
"	20..........	19	1,688,000	5,000	.4	78.4	14.	6.4	.8	—	—
"	27..........	25	1,804,000	3,800	4.1	70.5	15.9	5.	1.	3.5	—
June	7..........	27	2,964,000	4,800	—	86.8	4.	3.6	—	5.2	.4
July	31..........	30	2,977,600	8,600	.8	78.8	8.8	9.6	.4	1.6	—

REMARKS.

May 13th. Blood very fluid and coagulates very slowly. Marked poikilocytosis and polychromatophilia. Macrocytes and microcytes abundant. Reds give perfect picture of pernicious anemia save absence of megaloblasts.

20th, 20 normoblasts per cmm.; same remarks for reds.

Treatment. Peptomangan used in intervals.

May 13th, and 14th, strychnia and digitalis hypodermically; 15th, 2-25; 16th, felt better, stimulation hypodermically every 4 hrs.; 17th, hard chill and high fever, signs of tubercular pneumonia. 21st, creasote in 200 C. C. of water in increasing doses; 27th, many ova uncin., condition very bad; 28th, 4-20, hypo. injections stopped and tinct. digitalis and nux vomica used; June 8th, better. Asked to go home and was sent. July 8th, returned in hammock much improved but still very sick. Same treatment for tuberculosis and debility. July 15th, many ova of uncin.; 20th, 4-15, with .03 podophyllin. Discharged July 31st.

Result. Decidedly improved of uncinariasis and in her general condition. Her legs are no longer edematous.

Case 13. F. M. Barrio, Caguana. Admitted, May 13th. Age, 30; female; white; married, has borne 7 children; washerwoman, coffee-picker, and works on farm. Husband under treatment for uncinariasis. Later her child also. Has had two still-births. Says she has always been anemic. Usual food of country but has little to eat since husband has been ill. Has had mazamorra every coffee crop. Very extreme pallor. Skin like yellow parchment. No emaciation. Edema of lower extremities marked. Previously had general edema to extent that eyes were closed. Decided atrophy of skin. Perspires little. Appetite capricious; gastralgia; nausea; no vomiting; flatulence; tenderness of abdomen and epigastrium marked; meteorism; ascites; very constipated; enteralgia; feces, light reddish brown with a little blood, undigested food, and Charcot-Leyden crystals; fair number ova of uncinaria. Spleen and liver normal. Dyspnea; palpitation; much precordial pain; pulse, 112, very weak and compressible. Dilated heart with loud murmurs. Tremendous pulsations in neck and base of neck; on right side a distinct thrill; bruit-de-diable in jugulars. Much cough (from hypostatic edema of lungs); pain in chest. Dizziness; much tinnitus aurium; little headache; neuralgic pains; roaring in ears prevents sleep. She is a neurasthenic of the worst sort with a worn, excited, dissatisfied expression. Subject to fainting spells and hysterical attacks; patellar reflex abolished. Has not menstruated since having her first baby. Suffers from cold. Has had three abortions. Decided paresthesias in hands and feet. No disturbances of vision. Muscles flabby, sore and painful. So weak that she sank on the steps of the office, unable to move. Was brought in on horse. Is just out of puerperium, child died the first day.

Course. May 20th, She is decidedly better and walks without much assistance. From this on, she slowly improved.

Diagnosis. Chronic uncinariasis, extreme case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May 13..........	14	1.226,400	4,200	8.4	66.4	18.	6.	.8	—	.4
" 20..........	21	1,746,640	5,000	4.4	72.8	17.2	5.2	.4	—	—
" 27..........	21	2,084,400	5,600	2.8	65.2	17.6	9.2	.8	3.6	.8
June 3..........	22	2,504,000	4,000	3.2	64.8	13.2	14.8	.4	3.6	—
" 10..........	22	2,377,600	3,600	2.4	78.4	5.2	8.8	1.2	3.6	.4
" 17..........	32	2,555,200	2,800	3.2	63.2	22.	9.2	.4	1.2	.8
" 24..........	52	4,461,600	4,200	3.2	54.4	22.	19.2	1.2	—	—
July 1..........	41	3,528,800	4,200	2.8	61.6	19.6	15.2	.8	—	—
" 8..........	65	4,870,400	8,200	1.2	73.6	11.6	10.8	2.4	.4	—
" 15..........	78	4,852,800	4,200	5.6	52.8	26.4	14.8	.4	—	—
" 22..........	78	4,352,000	5,600	3.2	61.2	17.2	17.6	.4	.4	—
" 29..........	68	4,417,600	6,200	3.2	67.2	12.	16.4	.8	.4	—
August 7..........	95	5,092,800	8,200	4.8	68.	18.	8.	1.2	—	—
" 14..........	109	5,190,400	10,800	2.	56.	24.4	16.8	.8	—	—

REMARKS.

May 13th. Blood like beef washings. Coagulation very slow; very extreme poikilocytosis; polychromatophilia; macrocytes and microcytes abundant; 33.6 normoblasts per cmm. 20th, reds about same. Granules of polymorphonuclears large. June 17th, 11.2 megaloblasts and 11.2 normoblasts per cmm. July 1st, much poikilocytosis; microcytes predominate. July 15th, decided tendency to degeneration of leucocytes. Polymorphonuclears still present large granules. 22nd, reds nearly normal.

Treatment. Peptomangan used in intervals.

May 14th, 3-30; 20th, still few ova uncin.; 21st, 4-25; 27th, still fair number ova uncin.; 28th, 4-20; June 8th; no ova uncin. (2 specimens); 10th, no ova uncin.; 13th, no ova uncin.; 17th, no ova uncin.; 24th, no ova uncin.; July 1st, no ova uncin.; 8th, 15th, 29th, and 30th, no ova uncin. Discharged from hospital, 68% Hb. Aug. 7th, no ova uncin. but given 4-15 with .03 podophyllin. Expelled some parasites and Hb. rose to 109% on 14th. On 1st, stopped Peptomangan and gave Blaud's pills.

Result. Cured, Aug. 14th. The change in this woman is remarkable. She has good color and is fat and well.

Case 14. F. V. Barrio, Don Alonso. Admitted, May 14. Age, 14; white; no occupation, "when my father was rich, I always wore shoes but since the cyclone, I have been out in the mud barefooted." Father in insane asylum for some years; mother dead. Has been ill since the cyclone (Aug. 8, 1899.) Food, poor; often hungry. Pallor began after sharp attack of mazamorra. Has been taking patented iron pills. Very extreme pallor; not emaciated. General development good. General edema marked, extreme in lower extremities. Ulcers on legs in the past. Atrophy of skin. Does not perspire. Good appetite; gastralgia at times; vomits at times; flatulence; tenderness of abdomen and epigastrium; no meteorism nor ascites; bowels regular; enteralgia; feces, dark brown, no blood or mucus; loaded with uncinaria ova; a few of ascaris. Spleen and liver normal. Dyspnea; palpitation; pulse, 130, weak and compressible. Slight hemic murmur; heart not dilated. Pulsation of vessels in neck marked. Cough; little pain in chest. Much dizziness and tinnitus aurium. Temporal headache; sleeps poorly; a completely downcast and hopeless expression; is a well-educated boy of decent parents; has fainting spells; suffers from cold, and has paresthesias of legs and arms; blurred vision; muscles, flabby, sore, and painful. Great debility. Temperature 39.8°

Course. Had a little fever every day for a while but soon began to improve, and recovery was uneventful. He followed the Commission to San Juan on foot. This is one of the saddest cases we saw, one in which poor food, hard knocks, and abandonment broke down what must originally have been a strong resistance.

About the time the blood specimens showed bacilli, he had marked edema of left leg and foot. Right leg not edematous.

Diagnosis. Chronic uncinariasis, extreme case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	y.
May 14..........	16	1,551,200	7,800	18.3	50.	21.	9.2	1.5	—	—
" 21..........	31	2,133,280	6,200	14.4	51.6	20.	12.	2.	—	—
" 28..........	27	2,666,400	11,600	18.4	40.	26.8	10.4	1.2	3.2	—
June 4..........	30	3,880,000	9,800	28.4	24.4	27.2	9.6	1.2	8.8	.4
" 11..........	35	3,315,200	7,400	22.	50.	11.2	11.2	.4	5.2	—
" 18..........	50	4,181,600	14,800	17.2	43.6	25.2	10.	.8	2.4	.8
" 25..........	59	5,238,400	11,200	46.	26.	19.6	7.6	.8	—	—
July 2..........	56	5,288,800	7,400	22.	44.4	20.	12.	1.2	.4	—
" 9..........	55	5,195,200	11,200	32.4	21.6	30.4	14.	1.2	.4	—
" 17..........	64	5,461,600	8,600	40.	29.2	19.6	10.8	.4	—	—
" 23..........	64	5,786,400	4,800	18.	46.	24.8	10.8	.4	—	—
" 30..........	84	5,440,000	9,600	24.4	34.8	22.8	16.4	1.2	.4	—
Aug. 6..........	90	6,688,000	6,800	26.	31.6	32.8	8.4	.8	.4	—
" 14..........	101	5,928,800	10,200	28.4	30.4	31.6	6.8	.8	2.	—

REMARKS.

May 14th. Blood like beef washings; high grade of poikilocytosis and polychromatophilia; decided macrocytosis; 62.4 normoblasts per cmm. 21st, Poikilocytosis and polychromatophilia still severe. June 4th, 38.2 megaloblasts per cmm. July 9th, many bacilli. Aug. 6, no bacilli, reds normal.

Treatment. Peptomangan used in intervals.

May 15th, 3-25; 22nd, ova uncin.; 23rd, 3-20; 28th, ova uncin.; 29th, 4-20; June 9th, ova uncin.; 10th, 4-20; 18th, still a few ova uncin.; 19th, 4-20; 25th, no ova uncin.; July 3rd, 9th, 17th, and 23rd, no ova uncin.; 26th, discharged from hospital with 64% Hb. August 6th, no ova uncin. but many Charcot-Leyden crystals and 1 ovum of tricocephalus; 7th calomel .13, podophyllin .01 at night, and 4. extract filix mas next day. Expelled no parasites (at least it was so reported) but Hb. rose to 101% Aug. 14th.

Result. Entirely cured. Boy is rosy and perfectly well.

Case 15. L. B. Barrio, Salto Arriba. Admitted, May 14th. Age, 37; male; mulatto; married, three children; laborer on coffee plantations; has been ill since cyclone of 1899; usual food of country; has had much mazamorra; extreme pallor of mucous membranes, and dull, dirty, gray color of skin; not emaciated; general edema; ulcers on legs; atrophy of skin; does not perspire; appetite good; gastralgia; no nausea or vomiting; tongue has many dark pigmented spots; flatulence; tenderness of abdomen and epigastrium; meteorism; has had ascites; feces, diarrheal with mucus, a few Charcot-Leyden crystals, and an abundance of ova of uncinaria. Spleen normal, liver enlarged. Dyspnea; palpitation; precordial pain; pulse, 100, dicrotic and compressible. Heart murmur almost organic in character. Very pronounced pulsation of vessels at base of neck. Cough, and pain in chest. Much dizziness and tinnitus aurium; cerebellar and temporal headache; decided neuralgic pains. Sleeps good; is depressed, anxious, and hypochondriacal; subject to attacks of fainting; patellar reflex exaggerated; complete impotence; susceptible to cold; paresthesias in limbs. Urine, S. G. 1008, normal. Blurred vision; muscles flabby, sore, and painful. Great debility.

Course. Uneventful recovery. It is an interesting fact in this case that he was discharged from hospital the 25th of June with 68% of Hb, and from this time on, he complained bitterly of having only bananas to eat at home yet he became a strong and perfectly healthy man on this diet, with final Hb. of 110%

Diagnosis. Chronic uncinariasis, very severe case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May	14..........	11	1,608,800	19,200	20.8	48.	19.2	8.	4.	—	—
“	21..........	20	2,168,880	6,200	18.8	49.2	15.6	10.4	2.	4.	—
“	28..........	25	3,062,160	6,800	34.	46.	6.8	4.8	3.2	5.2	—
June	4..........	33	3,897,600	6,000	21.6	46.8	20.4	11.2	—	—	—
“	12..........	39	3,840,000	8,600	18.4	60.4	8.	7.6	3.6	1.2	.8
“	18..........	50	5,382,160	8,000	16.4	43.4	27.6	11.	1.2	—	.4
“	25..........	68	4,808,800	10,000	17.6	65.6	4.4	8.8	2.8	—	.8
July	2..........	72	4,737,600	14,000	27.6	52.	11.2	6.4	2.4	.4	—
“	8..........	86	4,617,600	8,000	28.4	51.6	12.4	4.8	2.4	.4	—
“	15..........	87	7,400,000	6,800	15.6	58.	14.	9.6	2.8	—	—
“	22..........	82	5,312,000	6,800	15.2	58.8	10.	14.	2.	—	—
“	29..........	95	5,021,600	9,600	22.8	54.4	14.8	7.2	.4	.4	—
Aug.	5..........	110	5,257,600	7,800	35.6	32.8	17.6	12.8	1.2	—	—

REMARKS.

May 14th. Blood appears like beef washings; coagulates very slowly. Great poikilocytosis and polychromatophilia; 153.6 normoblasts per cmm. Many macrocytes and microcytes, former predominating. May 21st, same except 24.8 normoblasts per cmm. June 4th, one enormous macrocyte seen, 20 microns in diameter. July 2nd, character of reds has changed from a similarity to pernicious anemia to a good counterfeit of chlorosis. Slight poikilocytosis, no polychromatophilia, many microcytes. In general, size of reds less than normal. July 15th, very large eosinophiles and many with granules scattered, no poikilocytosis nor polychromatophilia. Leucocytes all sizes, many degenerated. Eosinophiles same. 29th, reds about normal, whites same as on last date. Aug. 5th, reds normal. Leucocytes not degenerated except a few eosinophiles but still show great variety in size. Many enormous eosinophiles. Many blood plates.

Treatment. Peptomangan used in intervals.

May 15th, 4-40; 22nd, ova uncin.; 23rd, 4-25; June 2nd, no ova uncin.; 6th, 18th, and 25th, no ova uncin.; on June 25th, discharged from hospital with Hb. 68%. July 8th, 15th, 22nd, no ova uncin.; Hb. 82%. Changed from Peptomangan to Blaud's pills; 29th, and Aug. 5th, no ova uncin. Discharged August, 5th.

Result. August 5th, cured, A perfectly strong and healtly man, with excellent color.

Case 16. J. M. R. Barrio, Sabana Grande. Admitted, May 13th. Age, 27; female; white; married. Works on coffee plantations. Prevailing disease of family is anemia. Her grandfather and uncles died of it. Has been sick 12 years. Usual food of country. Has mazámorra every year at time of coffee picking. Has spent much money in iron tonics which have yielded no permanent result. Very marked pallor. No emaciation. Edema of face and lower extremities. General pruritus. Skin dry; does not perspire. No appetite; gastralgia; nausea; vomiting at times; flatulence; tenderness of abdomen; meteorism; enteralgia; feces, normal except for many ova of uncinaria, larvæ of strongyloides intestinalis, and Charcot-Leyden crystals. Spleen and liver normal. Much dyspnea; palpitation; sometimes precordial pain. Pulse, 88, weak; marked systolic cardiac murmur. Marked pulsation in vessels of neck. No cough nor pain in chest. Much dizziness, tinnitus aurium, and temporal headache; sleep normal. Subject to syncope. Patellar reflex abolished. Is sad and dispirited. Menstruation has stopped. Susceptible to cold, Has had one abortion. Urine S. G. 1013, normal. Blurred vision. Muscles flabby and painful. Very weak. Temperature 38°.

Course. Very slow due to difficulty in expulsion of uncinariæ.

Diagnosis. Chronic uncinariasis, marked case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May	15..........	20	1,656,000	6,700	12.8	74.4	9.2	2.8	.8	—	—
"	22..........	25	1,704,000	5,000	20.8	55.2	6.4	9.2	1.2	7.2	—
"	29..........	26	2,630,400	5,000	21.4	62.2	9.2	3.2	.4	3.6	—
June	5..........	31	2,640,000	5,200	16.8	58.8	14.4	5.6	.4	3.2	.8
"	12..........	36	3,184,000	5,000	16.	56.4	14.8	3.6	1.6	7.6	—
"	19..........	50	3,008,000	7,400	13.6	56.8	18.8	6.	1.6	3.2	—
"	26..........	55	3,280,000	6,400	14.4	72.8	8.8	1.6	1.2	1.2	—
July	3..........	42	4,048,000	5,400	14.	54.	30.	.4	—	1.6	—
"	10..........	45	4,064,000	5,600	10.8	62.4	22.	2.	1.2	1.2	.4
"	17..........	51	4,168,000	5,200	10.	66.4	16.	2.8	3.2	1.6	—
"	24..........	60	4,648.000	7,200	11.2	54.4	27.2	1.6	2.8	2.4	.4
"	31..........	64	4,088,000	7,800	13.2	61.2	12.8	12.	—	—	.8
Aug.	7..........	64	4,784,000	10,200	3.6	68.4	18.4	2.	.4	6.4	.8
"	14..........	90	5,320,000	7,400	3.2	74.4	13.2	6.	—	3.2	—

REMARKS.

May 15th. Blood very fluid and coagulates slowly. Poikilocytosis. Macrocytes and microcytes. August 14th. Reds have improved without incident and appear practically normal.

Treatment. Peptomangan used during intervals. May 14th, 2-30; 22nd, ova uncin.; 23rd, 3-20; 29th, ova uncin.; 30th, 3-20; June 9th, no ova uncin.; 13th, no ova uncin.; 19th, no ova uncin.; 26th, no ova uncin.; July 3rd, no ova uncin.; 10th, no ova uncin.; 17th, no ova uncin.; 25th, no ova uncin.; 31st, no ova uncin. By this time we began to be sure that, in spite of showing no ova in the feces, this woman still harbored many uncinariæ as her hemoglobin persistently refused to rise. Hence on Aug. 8th, there was administered .26 calomel and .02 podophyllin, and the next day, 8. extract of male fern. This brought away worms, and hemoglobin rose rapidly.

Result. August 14th. Cured, a ruddy, healthy woman.

Case 17. F. R. Barrio, Caniaco. Admitted, May 17. Age, probably 10 or 12; male; white; no occupation. Mother and some brothers died of anemia. He became sick about two years ago. Diet, vegetable, abundant. Has taken "iron powders" and home remedies. Not emaciated; very pallid; marked edema of face, trunk, and extremities. Has had mazamorra; general pruritus. Skin not atrophied but dry. Appetite poor; sometimes gastralgia; no nausea; no vomiting; pain and tenderness in abdomen and epigastrium at times; flatulence; meteorism; ascites. Bowels fairly regular, sometimes diarrhea. Feces contain slight amount of mucus, and enormous number of uncinaria ova. Also ova of ascaris lumbricoides and larvæ of strongyloides intestinalis. Dyspnea; marked palpitation; and "pain in heart." Pulse, 120, weak and compressible. Heart slightly enlarged and dilated. Apex wavy, indefinite, and displaced downward and outward. Fremitus marked. Hemic murmur very loud and harsh. Pronounced pulsation of vessels in neck. Cough, and pain in chest. Dizziness; tinnitus aurium; general headache. Sleeps badly on account of cough. Reflexes abolished. Mental condition, very bad; intelligence, nil; face bloated and expression extremely despondent. Paresthesias. No eye symptoms. Muscles very flabby, painful, and sore. Extremely weak. Temperature, 38°. C.

History given by man with whom he lived.

Course. Ascites became extreme requiring tapping of abdomen. Accompanied by severe watery diarrhea. After tapping, he became emaciated but improved in spirits and strength. Later, edema reappeared, and tapping repeated, but he rapidly sank and died of exhaustion.

Diagnosis. Chronic uncinariasis. Extreme case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May 17..........	9	1,062,160	9,200	1.6	76.4	12.4	8.8	.8	—	—
" 24..........	11	1,176,000	20,600	.4	92.	3.6	3.2	—	.8	—
" 31..........	12	924,000	13,600	—	96.4	.8	1.6	—	.8	.4
June 7..........	11	906,400	11,000	2.8	83.2	5.6	7.2	.8	.4	—
" 14..........	14	1,044,000	11,200	2.8	68.	12.4	13.2	.4	2.4	.8
" 21..........	15	1,524,000	19,400	.4	84.8	4.4	10.4	—	—	—

REMARKS.

May 17th, when first examination was made, had general edema so that it was impossible to get blood without serous fluid. Other examinations were pure blood. Extreme poikilocytosis and polychromatophilia. Many macrocytes and microcytes. 147.2 normoblasts to cu. mm. 31st, 217.6 normoblasts to cu. mm. More microcytes than macrocytes. About ⅛ of red cells are oval type of pernicious anemia. June 7th, many bacilli. Blood appears same. Edema beginning again. 21st, same.

Treatment. Peptomangan used in intervals.

May 18th, 2-20, followed by tr. digitalis and tr. nux vomica; 22nd, ascites required tapping, 2 liters of fluid removed. Continued stimulation by adrenalin, digitalis, and nux vomica; 24th, extremely weak. Severe diarrhea. Dover's powder. 28th, digitalis and nux vomica stopped, and fl. ext. kola given. Appetite much improved; 31st, many ova uncin.; June 10th, edema and diarrhea beginning again. Diarrhea controlled by tanigeno; 15th, no diarrhea. Thymol 1 gram without purge produced no unpleasant effect; 17th, ascites tapped, removing 6 liters of fluid. Stimulation renewed; 22nd, thymol 1 gram without purge. 25th. Stimulation by hypodermic injection.

Result. June 27th. Died of exhaustion.

Case 18. G. B. Barrio, Viví Arriba. Admitted, May 14. Age, 45; male; mulatto; married: laborer on coffee plantation. Had been somewhat sick before last coffee season. Then had a bad attack of mazamorra laying him up in bed 22 days. Failed rapidly since. Bedridden last four months. Ate usual food. Has taken some medicine, character unknown. Very pallid; emaciated. Edema of feet and ankles. Skin atrophied, dry, and harsh. Appetite good; no gastralgia; no nausea; no vomiting; tongue clean, but with black marking prominent; no flatulence; no pain in abdomen or stomach. Bowels constipated. Feces contain a great many ova of uncinaria. No dyspnea; palpitation; no pain about heart. Pulse, 90, very weak and compressible. Heart enlarged and dilated; very loud murmur. No cough. Dizziness; tinnitus aurium; slight frontal headache. Sleeps well; mental condition dulled; intelligence good. Reflexes abolished; impotent; expression hypochondriacal; very peevish; increased susceptibility to heat and cold; paresthesias very marked. Neurasthenic. Blurred vision. Muscles, very flabby, painful, and sore. Too weak to stand up. Temperature 38°. C. Has fever every evening.

Course. Fever continued about two weeks. Improved but little during the first few weeks, then improved rapidly in spirits and physical condition, but gained strength slowly. When discharged was beginning to walk.

Diagnosis. Chronic uncinariasis. Extreme case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May 14	16	1,584,000	5,400	.4	83.2	14.	2.	.4	Not counted.	
" 21	17	2,324,000	3,000	2.4	62.8	22.8	10.4	1.2	.4	—
" 28	24	2,264,000	3,200	2.	51.6	25.6	16.8	1.2	2.8	—
June 4	23	2,200,000	2,400	2.	57.	18.	18.	—	4.	1.
" 11	24	2,524,000	1,800	2.	54.4	14.4	18.4	2.	8.8	—
" 18	30	3,221,600	3,400	1.6	65.2	18.	13.6	.8	.8	—
" 25	30	3,274,400	4,200	1.6	64.4	16.8	12.	1.2	4.	—
July 2	29	2,992,800	5,200	4.4	59.2	16.4	19.2	.4	.4	—
" 9	40	3,172,800	3,200	1.6	60.8	22.	14.8	.8	—	—
" 16	51	3,392,000	7,600	2.	64.	18.8	14.	.8	—	.4
" 23	57	3,457,600	6,600	.8	60.	21.6	16.4	1.2	—	—
" 30	70	4,204,000	9,600	5.2	62.8	17.6	14.4	—	—	—
Aug. 6	67	4,360,000	8,600	5.6	63.2	16.4	12.4	2.	—	.4
" 13	80	5,492,800	9,000	6.8	68.	8.4	16.4	.4	—	—
" 19	82	5,795,200	6,400	3.6	72.	12.8	10.8	.8	—	—

REMARKS.

May 14th, extreme poikilocytosis and polychromatophilia. Great many macrocytes and microcytes; 28th, more microcytes than macrocytes. Macrocytes very large. 76.8 megaloblasts per cu. mm.; June 4th, 9.6 normoblasts and 19.2 megaloblasts to cu. mm.; July 2nd, much less poikilocytosis and polychromatophilia. Microcytes predominate over macrocytes; 16th, appearance of blood improving; August 13th, slight poikilocytosis. Polychromatophilia scarcely noticeable. 18 normoblasts per cu. mm; 19th blood almost normal.

Treatment. Peptomangan given in intervals.

May 18th, 4-40. Digitalis and nux vomica; 25th, 4-30; 29th, digitalis stopped. Improving; June 1st, ova uncin.; 4th, 4-25; 12th, ova uncin.; 13th, 4-25; 19th, ova uncin.; 4-25; 21st, given digitalis again; 26th, ova uncin.; 27th, 4-25; July 2nd, stopped digitalis. Adrenalin given. Some little edema of ankles; 3rd, ova uncin.; 4th, 4-15, preceded by .03 podophyllin; 17th, no ova uncin.; 25th, few ova uncin.; 26th, 4-15, preceded by .03 podophyllin; 31st, no ova uncin.; August 7th, few ova uncin.; 8th, 4-15, preceded by .03 podophyllin; 14th, no ova uncin.

Result Greatly improved. Still slight hemic murmur. No cardiac dilatation. Is beginning to walk. On several occasions, this patient was expected to die.

Case 19. J. C. S. Barrio, Arenas. Admitted, May 17. Age, 12; male; white; used to be a street vender of candies in Ponce; now works on a coffee plantation. Only disease in family is anemia; many died of it; "don't remember how many." In 1902, was cured of uncinariasis in Ponce (one of the 100 Ponce cases. See page 7). Began again to show symptoms about three months ago,—weariness, pain in chest, and a feeling as though "legs were dead" when he went to walk. Leaving Ponce in excellent condition, he came to Arenas and had a sharp attack of mazamorra at time of coffee picking. He positively assures us that his anemia came from this attack. Says he was ruddy and fat until his skin infection which occurred in November, 1903. In February, he began to notice symptoms of anemia. He is a very intelligent boy, and his former attack in Ponce has taught him what uncinariasis means. Decided pallor; lost weight, but general development is good; slight edema of eyelids. A large ulcer on leg, the remains of his mazamorra. General pruritus. No atrophy, but dryness of skin. Perspires. Good appetite; gastralgia; a little nausea, but no vomiting; flatulence; tenderness of epigastrium and abdomen generally; little meteorism. Bowels regular; no enteralgia. Feces, normal except for enormous number of ova of uncinaria. Spleen normal; liver slightly enlarged. Dyspnea, palpitation, and precordial pain. Pulse, 120, weak and compressible. *No heart murmur.* No abnormal pulsation noticeable in neck. Slight cough and pain in chest. Dizziness; little tinnitus aurium; general headache; sleeps well; depressed and quiet; intelligence excellent, and character matter-of-fact and phlegmatic. Suffers slightly from cold. Paresthesias of arms and legs. Urine; S. G. 1015, normal. Blurred vision. Muscles flabby, sore, and painful. Is very weak. Has slight fever every night.

Course. An uneventful and rapid recovery. The anemia was just beginning to reach a severe grade. He was not nearly so sick as during his previous attack as can be seen by comparison with case 4 of series published in "American Medicine, Sept. 5th, and 12th, 1903, this is notable in that heart is free from murmurs although anemia is more profound. After his complete cure, July 4, 1904, he went home. Returning on the 29th, he presented a severe case of mazamorra of the feet. From this time on the boy became paler and his appearance was that of a person heavily infected. Feces and blood were examined frequently without finding ova of uncinaria or marked eosinophilia. (See blood record). Further study of the case could not be made as the boy left for parts unknown.

Diagnosis. Acute uncinariasis. Severe case.

Transcript from notes on previous attack, 1902. Six years ill; ulcers on feet; very pale; edema in legs at times; abundance of ova of uncinaria and Charcot-Leyden crystals; dull pain over heart; pulse, 88 (dorsal decubitus), weak, small, and compressible; marked pulsations vessels of neck. Heart: Inspection; wavy impulse diffused over entire precordium. Palpation; forcible impulse just outside nipple line. Percussion; dullness extends from sternum to 1 inch beyond nipple, from 3rd rib, downward. Auscultation; loud, harsh murmur taking place of first sound, heard with greatest intensity over apex, and transmitted to sternum and axilla. Much dizziness, etc. Apathetic. Patellar reflex diminished. Urine; S. G. 1005, normal. Pains in legs, and extreme weakness.

July 7th, '02; Hb. 51%; reds, 2,802,160; whites, 7,000.
Aug. 22nd, '02; " 74%; " 4,806,400; " 3,000.
Differential: E., 38%; P., 42%; S. L., 15%; L. L., 5%.
November 15th, '02; Hb., 75%; reds, 4,942,000.

Treatment. Vallet pills used in intervals.

July 7th, 2-30; 24th, 2-30.

Result. Regained strength and color. Seen later in perfect health.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May	17..........	28	3,480,000	7,400	10.	53.2	27.2	8.4	1.2	—	—
"	24..........	29	3,024,000	7,200	8.	71.2	6.	10.8	1.6	2.4	—
"	31..........	30	3,864,000	5,000	8.8	62.4	15.2	8.8	.4	3.6	.8
June	7..........	50	3,981,600	11,600	4.	64.4	8.4	12.	2.	9.2	—
"	14..........	54	5,786,400	4,200	8.8	40.	32.8	13.2	—	5.2	—
"	21..........	66	5,355,200	5,800	10.4	42.	32.4	13.2	2.	—	—
"	28..........	90	6,195,200	6,400	12.	51.2	20.	10.	1.2	5.6	—
July	4..........	103	7,088,000	17,800	6.4	59.6	16.8	10.	.8	6.4	—
"	21..........	115	—	—	—	—	—	—	—	—	—
Aug.	2..........	95	—	—	7.2	60.8	14.4	16.	.8	.8	—
"	3..........	92	—	—	8.8	43.2	26.	20.8	.8	.4	—
"	4..........	92	—	—	6.4	41.6	21.6	29.2	1.2	—	—
"	6..........	85	—	—	6.	39.2	21.2	32.8	.8	—	—

REMARKS.

May 17th, blood very fluid and coagulates slowly. Poikilocytosis; polychromatophilia; many macrocytes; microcytes; 24th, 28.8 normoblasts per cmm.; 31st, 60 normoblasts per cmm.; July 4th, reds normal. On the 1st of Aug., the reds were still normal. On the 4th, many Charcot-Leyden crystals in feces. On the 6th; same. Reds show beginning poikilocytosis.

Treatment. Peptomangan used in intervals.

May 18th, 3-25; 26th, abundance of ova uncin.; 27th, 4-25; June 3rd, still ova uncin.; 4th, 4-25; 12th, still ova uncin.; 15th 4-25; 21st, ova uncin.; 22nd, 4-25; 28th, no ova uncin.; 4th, no ova uncin.; discharged.

Result. Cured. The boy left hospital, July 4th, with excellent color, and perfectly well. He returned on the 29th, having become reinfected.

Case 20. R. P. Barrio, Caonillas. Admitted, July 20. Age, 17; female; white; works at home, washing, taking care of animals, etc. Up to 2 years ago was strong, ruddy, agile, and always cheerful, at that time she went barefooted into her back yard and infected herself heavily with mazamorra. She remembers the day this occurred, and says that never before nor since has she had this dermatitis. In about one or two weeks from that time, she began to have pain in the stomach. Later, followed weakness, fatigue on slight exertion, headache, profound mental depression, and slight pallor. The pallor and other symptoms increased, reaching a profound grade. Her food is of best quality and is abundant, as she is not poor. Has taken much iron which made her feel temporarily better but afterward worse than before. Has an extreme, dirty, yellow, pasty pallor; not emaciated; face a little edematous in the morning; general pruritus; no atrophy of skin. Has good appetite; no gastralgia; at times nausea; no vomiting. Bowels regular; no enteralgia; feces normal but for enormous number of uncinaria ova. No dyspnea; palpitation; no precordial pain. Pulse, 112, normal strength and volume. Slight hemic murmur. Marked pulsation in vessels of neck. Has slight cough. Sputum examined but no tubercle bacilli found. Dizziness; tinnitus aurium; temporal headache; is always sleepy; is almost melancholic. Has fainting spells. Patellar reflex abolished. Menstruation scanty. Suffers from cold. Urine; S. G. 1012, normal. Blurred vision. Muscles flabby and painful. Great weakness. Temperature 38°.

Course. Very rapid improvement.

Diagnosis. Chronic uncinariasis. Severe case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
July	21..........	22	2,976,000	9,800	15.6	66.8	10.8	2.	.8	4.	—
August	2..........	39	3,232,000	7,800	16.	63.2	18.	2.8	—	—	—
"	9..........	62	4,832,000	6,000	10.	65.2	18.8	4.	1.2	.8	—
"	16..........	70	5,284,000	9,600	6.	68.	23.2	2.4	—	.4	—

REMARKS.

On entrance, the reds showed some poikilocytosis and polychromatophilia, macrocytosis and microcytosis, but not so much as would be expected with such low hemoglobin. Improvement was rapid until they appeared almost normal on Aug. 9th.

Treatment Blaud's pills used in intervals.

July 26th, 4-15, with .02 podophyllin; this dose caused much dizziness and debility but not at all alarming; 30th, heart murmur much diminished; Aug. 2nd, very few ova uncin.; 3rd, 3-15, with .01 grain podophyllin. No dizziness nor weakness on administration of drug; 9th, much improved, so much so that she appears entirely changed. Is cheerful and active. Few ova uncin.; 10th, same as 3rd; 16th, ova uncin.; 3-15, with .02 podophyllin. Wonderful improvement. 19th, no ova uncin. Discharged.

Result. Practically cured, Aug. 19th. We heard, on Oct. 6th, that she was "perfectly well, a very light hearted girl with a fine color."

Case 21. J. E. A. Barrio, Salto Arriba. Admitted, May 17. Age, 13; male; white; coffee picker. Disease of the family is anemia; father and mother died of it. He has been sick four years. Usual food of country. Has had mazamorra. Has taken much iron, without betterment. Marked pallor giving him a dirty, pasty, yellow color. Not emaciated. Edema of face and lower extremities. General pruritus. Skin atrophied; dry; does not perspire. Good appetite; gastralgia; no nausea or vomiting; flatulence; tenderness of abdomen; meteorism; enormous ascites. Bowels regular; at times enteralgia; feces normal save for ova of uncinaria, Charcot-Leyden crystals, and a few ova of ascaris. Spleen and liver normal. Dyspnea; palpitation; precordial pain; pulse, 123, weak. Heart enlarged; hemic murmur marked; marked pulsation vessels of the neck. No cough. Pain in chest. Much dizziness; constant tinnitus aurium; frontal headache; sleep normal; patellar reflex abolished. Is dispirited and lifeless. Suffers from cold. Urine; S. G. 1014, normal. Tendency to dilatation of pupil. Muscles flabby, painful, and very weak.

Course. Uneventful but slow. Had great difficulty in expelling last few parasites.

Diagnosis. Chronic uncinariasis. Extreme case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May 17	13	1,240,000	6,300	6.4	55.6	27.6	8.4	2.	—	—
" 24	13	1,280,000	6,400	8.8	59.2	22.	8.	2.	—	—
" 31	37	3,656,000	6,200	22.	43.2	18.8	2.4	1.2	12.	.4
June 7	40	3,880,000	4,200	27.2	58.4	9.2	2.4	—	2.8	—
" 14	70	4,408,000	5,200	26.8	45.2	18.4	5.2	2.4	2.	—
" 21	77	4,512,000	6,400	13.6	55.2	18.4	6.8	2.	4.	—
" 28	75	3,760,000	3,800	23.2	50.4	16.8	5.6	.8	3.2	—
July 5	79	4,848,000	6,000	26.	52.8	16,4	2,8	2.	—	—
" 12	82	4,480,000	5,600	26.8	40,	26.	4.	1.6	1.6	—
" 19	89	4,928,000	6,800	28.	56.8	7.6	5.6	.4	1.6	—
" 26	102	5,040,000	6,400	14.8	66.	17.6	1.2	—	.4	—

REMARKS.

May 17th, blood very fluid and coagulates slowly, poikilocytosis, polychromatophilia, macrocytes, and microcytes. Steadily improved to normal.

Treatment. Blaud's pills used in intervals.

May 19th, 2-30; 24th, ova uncin.; 25th, 2-25; June 2nd, ova uncin.; 3rd, 2-20; 10th, ova uncin.; 11th, 2-20; 21st, many ova uncin.; 22nd, 3-20; 28th, ova uncin.; 29th, 3-20; July 5th, ova uncin.; 11th, ova uncin., many Charcot-Leyden crystals; 13th, 3-10, with .02 podophyllin; 19th, no ova uncin.; 26th, few ova uncin.; 27th, 3-10, with .03 podophyllin; Aug. 2nd, no ova uncin. Discharged.

Result. Cured, August 2nd. This boy is so completely changed as hardly to be recognizable by his friends. He is perfectly well, ruddy, and full of mischief.

Case 22. P. G. Utuado. Admitted, May 18. Age, 9; female; white; works in a banana patch: has been ill one year; usual food of the country; she says that she was well until she contracted mazamorra; has taken "iron powders." Decided pallor, of pasty, dirty, yellow color; not emaciated. Edema of face and lower extremities; eyelids very puffy. Has had ulcers on her feet; no atrophy of skin; does not perspire. Good appetite; gastralgia; nausea; no vomiting; flatulence; meteorism; constipated; enteralgia; feces, soft, dark, and contain many ova of uncinaria, some of ascaris, Charcot-Leyden crystals, and meat fibres. Spleen and liver normal. A little dyspnea; palpitation; pain in precordium; pulse, 120, fairly strong and full. Heart hypertrophied; marked hemic murmur. Marked pulsation veins of neck. No cough. Much dizziness; tinnitus aurium; frontal headache. Sleeps well. Patellar reflex abolished. Has a despondent air. Intelligence good. Susceptible to cold. Urine; S. G. 1014, normal. Blurred vision. Muscles flabby and painful. Temperature 37.8°.

Course. Uneventful convalescence.

Diagnosis. Chronic uncinariasis, severe case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May	18	12	984,000	5,200	8.	73.6	16.4	1.6	.4	—	—
"	25	17	1,304,000	7,800	12.8	70.	11.2	5.2	.8	—	—
June	1	35	2,264,000	6.200	10.	60.	17.6	2.8	2.	7.6	—
"	8	52	4,101,600	7,200	16.	56.6	14	6.	2.	5.4	—
"	15	72	4,536,000	5,200	8.8	44.	26.8	8.4	.8	7.6	3.6
"	22	75	5,064,000	7,400	14.	56.6	25.8	.8	1.2	1.6	—
"	29	71	5,624,000	7,800	9.6	62.	14.8	7.2	1.2	5.2	—
July	6	75	5,600,000	7,600	12.	58.	22.	2.	1.2	4.8	—
"	13	85	5,432,000	5,200	12.4	58.8	16.	8.4	1.6	2.	.8
"	20	91	4,712,000	7,400	6.	52.4	32.	5.6	1.2	2.8	—
"	27	104	4,840,000	4,200	7.2	61.6	26.4	3.2	1.2	.4	—

REMARKS.

Blood changes typical.

Treatment. Blaud's pills used in the intervals.

May 19th, 2-20; 25th, ova uncin.; 26th, 2-15; June 3rd, no ova uncin.; 9th, a few ova uncin.; 10th, 2-15; 17th, attack of subacute enteritis. Given calomel .130 followed by tanigeno .324 t. i. d.: 20th, ova uncin.; 22nd, 2-15; 30th, no ova uncin.; July 7th, to 28th, and August 6th, no uncin.;

Result. Cured, July 27th. A hearty, ruddy girl. This child has gained wonderfully in weight.

Case 23. M. E. Barrio, Sabana Grande. Admitted, May 18. Age, 30; female; white; married; works in fields as well as in house. Mother and several brothers and sisters anemic. Says she has been pale for a long time and very sick for five months. Vegetable food. Cannot remember if she had mazamorra. Extreme pallor; edema of face, trunk, and extremities; skin atrophied and dry; appetite, poor: gastralgia; nausea; vomiting; tongue slightly coated; flatulence; pain in epigastrium and abdomen; ascites marked. Bowels constipated. Feces contain great many ova of uncinaria. Dyspnea; palpitation; pain in heart. Pulse, 115, weak, dicrotic, and compressible. Heart not enlarged; hemic murmur marked; strong pulsations of vessels in neck. "Heart cough"; pain in chest; dizziness; tinnitus aurium; headache; sleeps fair; mental condition is bad, very despondent; intelligence poor; expression, very sad; syncope frequent; susceptibility to heat and cold increased. Paresthesias very marked. Blurred vision. Muscular system, flabby, painful, sore, and very weak, can scarcely walk. Amenorrhea. Temperature slightly elevated at night.

Course. Uneventful and rapid improvement.

Diagnosis. Chronic uncinariasis, severe case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May 18..........	14	2,372,800	9,000	.4	83.	7.8	8.	.8	—	—
" 25..........	18	2,024,000	4,200	4.4	75.6	10.4	7.6	—	2.	—
June 1..........	20	2,696,800	4,800	6.	65.6	12.8	12.8	1.2	1.6	—
" 8..........	44	4,520,000	21,600	3.2	81.6	4.	7.6	1.6	1.6	.4
" 15..........	51	4,832,000	5,400	4.8	75.2	10.	8.	.8	1.2	—
" 22..........	60	6,244,000	4,200	4.4	65.6	15.2	12.	.4	2.4	—
" 29..........	65	5,417,600	7,800	5.6	73.6	14.8	6.	—	—	—
July 6..........	80	5,467,200	7,000	2.4	82.8	10.8	3.6	.4	—	—

REMARKS.

May 18th, great poikilocytosis and polychromatophilia. Many macrocytes, microcytes and oval forms; June 8th, 57.6 normoblasts per cu. mm. One basophilic lymphocyte. Polymorphonuclear leucocytosis causing relative low percentages of other classes. 29th, some poikilocytosis and polychromatophilia. Few macrocytes and microcytes. July 6th, no polychromatophilia nor poikilocytosis. Very few macrocytes and microcytes.

Treatment. Blaud's pills used in intervals.

May 18th, tr. digitalis and tr. nux vomica; 20th, 4-30; 26th, few ova uncin.; June 8th, ova uncin.; 4-25. Became outpatient; 15th, no ova uncin.; 22nd, no ova uncin.; July 6th, walked in from country without more than ordinary fatigue.

Result. Practically cured. Has rosy color. Ceased to return.

Case 24. V. R. Barrio, Tetuan. Admitted, May 18. Age 22; male; white; single; laborer on coffee plantations. Father died of "a pain," mother of anemia; eight months ago he had a good healthy color; good food before illness, now poor because of illness and inability to work. Has been ill since last coffee season when he had severe attack of mazamorra. Has taken iron constantly since illness began but to no effect. Very extreme pallor. Is well nourished. Has had edema of face, legs, and trunk. Ulcer on leg. No atrophy of skin but does not perspire. Good appetite; gastralgia; nausea and vomiting; flatulence; no tenderness abdomen; constipated; no enteralgia; feces normal but for many ova of uncinaria. Spleen and liver normal. Suffers much from dyspnea; palpitation; rarely has precordial pain. Pulse 150, weak and compressible. Heart enlarged, dilated; murmur seems organic in character. Pulsation of vessels of neck. Little cough; no pain in chest. A great deal of dizziness; tinnitus aurium; sometimes frontal and temporal headache: sleeps well; is downcast and apathetic; frequent syncope; patellar reflex abolished; very susceptible to cold. Has paresthesias of legs. Pupil tends to dilate; has blurred vision. Muscles flabby, sore and painful. Great weakness. Temperature 38°. Says he does not expect to get well.

Course. A very slow convalescence. From 5th of June to 13th of July no ova of uncinaria. July 13th, ova found, thymol given and Hb. rose.

Diagnosis. Chronic uncinariasis, severe case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May	18..........	20	2,195,200	9,800	4.4	74.4	14.	4.8	2.4	—	—
"	25..........	21	2,144,000	7,400	8.	58.1	19.5	9.	1.5	3.9	—
June	1..........	20	1,572,000	7,400	8.	53.2	12.	14.	.8	10.4	1.6
"	8..........	22	1,955,200	7,400	5.7	54.1	21.4	12.4	1.4	5.	—
"	15..........	22	2,332,800	6,200	5.2	51.6	30.	12.	.4	.8	—
"	22..........	32	2,760,000	6,400	1.6	51.2	26.	19.6	1.6	—	—
"	29..........	32	2,384,000	5,600	9.6	30.8	32.8	22.4	2.8	1.6	—
July	6..........	34	2,435,200	8,000	10.4	55.6	20.8	12.4	.8	—	—
"	13..........	32	3,137,600	8,000	6.4	54.4	16.8	20.	.8	1.6	—
"	20..........	46	4,244,000	8,000	8.4	56.	22.8	11.6	.4	.8	—
"	27..........	60	4,496,000	8,800	13.2	49.2	21.2	16.4	—	—	—
Aug.	3..........	75	4,417,600	9,400	16.	52.4	17.6	12.8	1.2	—	—
"	10..........	70	4,635,200	10,000	12.8	49.2	22.8	14.	1.2	—	—
"	16..........	75	5,088,000	7,600	9.2	46.4	27.2	16.4	.4	.4	—
"	19..........	90	6,440,000	7,000	10.4	51.6	24.	12.4	1.2	.4	—

REMARKS.

May 18th, blood like beef washings. Coagulates slowly. Very marked poikilocytosis; slight polychromatophilia. 39.2 normoblasts per cmm. June 15th, 74.4 normoblasts per cmm. 29th, great poikilocytosis, polychromatophilia. Microcytes very abundant and exceed macrocytes. July 6th, reds same, 16 normoblasts per cmm. Aug. 16th, reds normal.

Treatment. May 19th, 4-40; 26th, many ova uncin.; 27th, 4-25; June 4th, ova uncin.; 5th, 4-30; 11th, 16th, 22nd, 29th, July 6th, no ova uncin.; 13th, few ova uncin.; 14th, 4-15, preceded by .03 podophyllin; 20th, 28th, Aug. 2nd, 9th, 15th, and 18th, no ova uncin. Discharged from hospital.

Result. Cured, Aug, 18th. Is perfectly well, strong, fat, and ruddy.

Case 25. R. G. Barrio, Paso Palmas. Admitted, May 19. Age, 19; female; white; single, coffee picker. Father and one brother died of anemia. Her first symptoms were great weariness and her body "went to sleep". Usual food of country. Has mazamorra every coffee season. Has taken much iron. Extreme pallor of a dirty, waxy color. Is emaciated. Edema of face and lower extremities. General pruritus. Has had ulcers on legs. Decided atrophy of skin. Does not perspire. Good appetite; gastralgia; no nausea or vomiting; no flatulence; tenderness of abdomen; meteorism; feces normal save for abundance of ova of uncinaria. Spleen and liver normal. Dyspnea; palpitation; precordial pain; pulse, 103, weak and compressible. Very pronounced hemic murmur. Marked pulsation in vessels of neck. Dizziness; tinnitus aurium; frontal and temporal headache; sleepless; has fainting spells. Patellar reflex abolished. Tactile sense normal. Is very much depressed. Has not menstruated for two or three years. Susceptible to cold. Paresthesias of feet. Blurred vision. Muscles flabby. sore and painful. Great debility. Temperature 37.5° This woman was brought in a hammock. From her waist down she was apparently paralyzed.

Course. In one week she was walking; from this time on, her recovery was uneventful. Has pulmonary tuberculosis. A casual observer might have diagnosed this case "beri-beri"

Diagnosis. Chronic uncinariasis, severe case.

Complication. Pulmonary tuberculosis.

DATE.		Hb.	Red cells.	Lencocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May	19..........	22	1,946,640	3,200	6.8	67.2	14.	10.8	1.2	—	—
"	26..........	27	2,452,800	6,000	2.8	68.8	18.	6.	.4	3.6	.4
June	2..........	32	3,320,000	7,200	4.4	66.8	12.8	11.6	.4	4.	—
"	9..........	54	4,226,400	16,400	3.2	80.	6.4	5.6	.8	4.	—
"	16..........	51	5,017,600	10,400	1.2	80.8	11.2	2.8	1.6	2.4	—
"	23..........	76	4,591,040	9,400	2.4	75.6	11.6	9.2	.4	.8	—
"	30..........	100	5,184,000	6,800	1.6	86.	7.6	4.4	.4	—	—

REMARKS.

May 19th. Blood very thin and coagulates slowly. Extreme poikilocytosis and polychromatophilia; 25.6 megaloblasts and 12.8 normoblasts per cmm. Many macrocytes and microcytes; 26th, still great poikilocytosis; 24 megaloblasts per cmm. Many macrocytes. June 2nd, appearance of blood improving; 28.8 megaloblasts per cmm. June 30th, reds normal.

Treatment. Blaud's pills used in the intervals.

May 20th, 4-40; 26th, few ova uncin.; 27th, 4-20; June 4th, ova uncin.; 5th, 4-20; 9th, no ova uncin.; 12th, ova uncin.; 18th, 4-20; 24th, no ova uncin.; 30th, no ova uncin. Many Charcot-Leyden crystals. July 5th, discharged cured.

Result. Cured of uncinariasis. Tuberculosis quiescent. Is apparently well and strong but is still emaciated.

Case 26. J. G. Q. Barrio, Caonillas. Admitted, May 19th. Age, 30; male; white; single; laborer on coffee plantation. One year sick. Usual food of country. One month after last attack of mazamorra his anemia began. Has taken iron without betterment. Moderate pallor. No emaciation. No edema. General pruritus. Ulcer on leg. No atrophy of skin. No dryness of skin. Good appetite; gastralgia at times; no nausea nor vomiting; no tenderness of abdomen. Bowels regular. Feces contain many ova uncinaria, Charcot-Leyden crystals, and ova of tricocephalus. Spleen and liver normal. No dyspnea; sometimes palpitation and precordial pain. Pulse, 82, strong and full. No cardiac murmur. No cough nor pain in chest. Dizziness; tinnitus aurium; frontal headache; sleeps well; Patellar reflex exaggerated. Is stupid and depressed. Suffers from cold. Urine; S. G. 1019, normal. Muscles flabby and painful. Is very weak. Temperature, 37.6 °.

Course. Usual for uncinariasis of this degree.

Diagnosis. Chronic uncinariasis, moderate case but with profound nervous symptoms.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May 19.........	52	2,420,000	9,400	20.8	54.	15.2	8.8	1.2	—	—
" 26..........	45	4,417,000	9,600	7.	72.4	13.	7.	.3	.3	—
June 2..........	50	3,764,000	9,800	7.2	80.	4.8	3.6	.8	3.6	—
" 9..........	61	5,280,000	6,800	4.	75.2	16.	3.6	.8	.4	—
" 16	85	5,536,000	6,000	3.2	68.	24.	3.6	.8	—	.4
" 23..........	93	5,384,000	6,800	7.2	65.6	18.8	6.	1.2	.4	.8
" 30..........	88	4,840,000	7,000	6.4	53.6	32.	6.	1.6	.4	—
July 7..........	93	4,968,000	7,200	7.2	56.	28.8	6.4	1.2	.4	—
" 14..........	93	5,288,000	7,000	16.	52.4	25.6	3.6	1.2	1.2	—
" 21.........	97	—	—	—	—	—	—	—	—	—
" 28..........	100	5,392,000	6,800	10.	62.4	24.	3.6	—	—	—

REMARKS.

Blood slightly more fluid than normal. Coagulates slowly. Slight poikilocytosis; macrocytes and microcytes. June 28th, Blood improved steadily to normal.

Treatment. Blaud's pills used in intervals.

May 20th, 4-25; 26th, ova uncin.; 27th, 4-25; June 4th, ova uncin.; 5th, 4-25; 9th, no ova uncin.; 10th, 4-25; 17th, ova uncin.; 18th, 4-25; 25th, no ova uncin.; 30th, no ova uncin.: July 14th, no ova uncin.; Aug. 6th, discharged.

Result. Cured, July 28th, all symptoms have disappeared. Rosy complexion.

Case 27. M. T. Barrio, Mameyes Arriba. Admitted, May 20. Age, 18; male; white; unmarried; field laborer and coffee picker. Mother and two brothers are patients of the Commission. History of malaria, slight attack five years ago. Has been sick three years. Diet mainly vegetable, occasionally meat. Always had plenty to eat until became too weak to work steadily. Has taken various home remedies, and patent medicines advertised to cure "anemia", without appreciable effect. Is very pale. Sometimes has edema of face and arms. Has had mazamorra which left ulcers on legs. Slight pruritus, skin atrophied and dry. Never perspires. Appetite good; gastralgia; nausea and vomiting at times; tongue clean; flatulence; meteorism; pain in abdomen and epigastrium; no ascites. Bowels constipated. Feces contain many ova of uncinaria. Dyspnea on exertion; palpitation and slight pain over heart. Pulse, 90, fairly strong and full, but compressible. Very pronounced hemic murmur. No cough. Dizziness, marked tinnitus aurium; severe headache. Sleeps badly. Mental condition and intelligence, good; expression despondent. Impotent. Paresthesias. No eye symptoms. Muscles flabby, painful, sore, and weak. Temperature 37.7°. C.

Course. Progressed rapidly to cure.

Diagnosis. Chronic uncinariasis, severe case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May	20..........	24	2,288,000	3,400	8.8	65.2	10.3	14.6	1.1	Not counted	
"	27..........	25	2,288,000	8,400	17.2	45.6	21.2	8.	1.2	6.4	.4
June	3..........	44	3,248,800	5,000	12.	54.	13.6	10.8	1.6	6.4	1.6
"	10..........	54	4,852,800	5,000	20.	57.2	6.8	9.6	1.6	4.	.8
"	17..........	62	5,224,000	5,800	13.2	63.2	12.8	9.2	.4	1.2	—
"	24..........	70	6,390,400	4,200	11.2	64.	8.8	12.	1.6	2.4	—
July	1..........	96	6,214,300	5,200	14.4	62.4	12.4	8.	1.2	1.2	.4
"	8..........	97	5,386,400	7,200	12.8	67.2	11.2	7.2	1.2	—	.4
"	15..........	100	5,600,000	9,000	7.4	72.	11.6	7.4	1.2	.4	—
August	1..........	120	—	—	—	—	—	—	—	—	—

REMARKS.

May 20th, well marked poikilocytosis and polychromatophilia. Some macrocytes; many microcytes; 40.8 normoblasts per cu. mm.; 27th, 67.2 normoblasts per cu. mm; one had two nuclei.; June 3rd, blood improving; 17th, appearance of blood much improved; July 1st, blood appears normal.

Treatment. Blaud's pills given in intervals.

May 21st, 4-30; 27th, few ova uncin.; 28th, 4-25; June 3rd, many ova uncin.; 4th, 4-25; 16th, no ova uncin.; 17th, very few ova uncin.; 18th, 4-30; 24th, no ova uncin.; July 1st, no ova uncin.; 8th, no ova uncin.; 17th, no ova uncin. Discharged.

Result. Cured. Murmur disappeared. Has excellent color.

Case 28. R. S. Jayuya. Admitted, May 20. Age, 17; male; white; unmarried; laborer in tobacco fields. Family history indefinite; some anemic, some not. Diet, vegetable. Has taken a little medicine from city dispensary. Sickness began about 3 years ago. Very marked pallor; no emaciation; general development good. Skin atrophied and dry; never perspires. Good appetite; no gastralgia; no nausea; no vomiting; tongue clean; no flatulence; no pain in abdomen or epigastrium. Bowels regular. Feces contain great many ova of uncinaria. No dyspnea; palpitation; no pain about heart. Pulse, 114, weak and compressible. Heart not enlarged. Hemic murmur very pronounced. Distinct pulsation in external jugular vein. Dry cough. Dizziness; tinnitus aurium; headache; neuralgia at times; sleeps well. Mental condition and intelligence good. Expression better than usual with such patients. Reflexes slightly exaggerated; impotent; paresthesias. Blurred vision. Muscles weak and flabby. Temperature 36.8 °. An interesting case in view of the comparatively slight symptoms in relation to the low hemoglobin.

Course. Improved with remarkable rapidity at first, then very slowly.

Diagnosis. Chronic uncinariasis. Severe case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May	22..........	11	1,616,000	3,200	14.	51⅓	20.	12⅔	1⅔	⅓	—
"	29..........	20	1,821,600	6,000	15.2	56.	13.2	10.4	2.	2.4	.8
June	5..........	40	3,848,800	4,400	24.	48.8	9.2	10.4	3.6	3.6	.4
"	12..........	54	5,124,000	4,000	30.4	48.	8.8	11.2	.8	.8	—
"	19..........	73	6,430,400	5,200	42.8	33.6	8.	9.6	.8	5.2	—
"	26..........	73	5,261,600	9,800	28.8	45.6	10.4	8.4	1.2	5.6	—
July	3..........	88	5,475,200	8,600	12.4	68.4	9.6	7.6	.8	1.2	—
"	10..........	90	5,506,400	7,000	16.4	57.2	11.2	11.6	1.6	2.	—
"	17..........	85	5,635,200	8,800	16.4	66.4	8.8	6.4	.8	.8	.4
"	24..........	90	5,426,400	12,400	22.	44.	16.4	16.	.4	.8	.4
"	31..........	101	5,532,800	10,600	24.8	56.4	10.	8.	—	.8	—

REMARKS.

May 22nd, well marked poikilocytosis and polychromatopilia; 12.8 normoblasts to cu. mm. Macrocytes more numerous than microcytes; 29th, 24 normoblasts to cu. mm.; July 3rd, reds appears practically normal.

Treatment. Blaud's pills used in intervals.

May 22nd, tr. digitalis and tr. nux vomica; 23rd, 3-20; 29th, many ova uncin.; June 1st, 4-25; 9th, some ova uncin.; 10th, 4-20; 19th, ova uncin.; 20th, 4-25; 26th, no ova uncin.; July 3rd, no ova uncin.; 10th, no ova uncin.; 17th, no ova uncin.; 24th, no ova uncin.

Result. Cured. No heart murmur, His facial expression and color had so changed that acquaintances did not recognize him on his return home.

Case 29. J. M. Barrio, Caguana. Admitted, June 8. Age 23; male; white; unmarried; laborer on coffee, sugar, and tobacco plantations; mother and father died of "anemia". Had measles. Was 5 months in Arecibo City Hospital for "malarial fever" (?) Present sickness began about one year ago with weariness, indigestion, and shortness of breath. Diet usual vegetable food of country people. When financially able, bought various preparations of iron wines, some times with benefit, sometimes without. Pallor is well marked; no emaciation; general development good. Feet and ankles edematous. Has had general pruritus, but little mazamorra. Scar of ulcer on left leg. Skin atrophied; dry; no perspiration. Appetite variable; gastralgia; nausea; vomiting; tongue slightly coated; no ascites; some pain in abdomen; flatulence. Bowels, alternating diarrhea and constipation. Feces contain slight amount of mucus, and vast numbers of ova uncinaria. Slight dyspnea; palpitation; pain about heart. Pulse, 102; fairly strong; dicrotic; fairly full but compressible. Heart not enlarged. Pronounced hemic murmur. Slight cough, expectoration, and pain in chest. Dizziness; tinnitus aurium; headache at times; no neuralgia. Sleeps well; Syncope; reflexes normal. Mental condition fair; usual hopeless expression; intelligence fair; paresthesia. Blurred vision and night-blindness. Muscles flabby, weak, painful, and sore. Has pain in joints. Temperature 37° C.

Course. Improved steadily but very slowly. One of our most stubborn cases. Very difficult to expel all uncinariæ.

Diagnosis. Chronic uncinariasis. Severe case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June	10..........	24	2,492,800	7,400	15.2	60.4	9.6	11.2	.8	2.4	.4
"	17..........	26	2,692,800	13,000	12.	56.	18.	11.6	1.2	—	1.2
"	24..........	25	1,977,600	8,200	14.8	53.2	16.	11.2	2.8	1.6	.4
July	1..........	29	3,071,040	8,400	23.6	50.	15.2	10.4	.4	.4	—
"	8..........	35	2,604,000	6,800	22.4	48.8	16.8	10.	1.6	—	.4
"	15..........	38	2,790,400	8,000	18.	44.	26.	11.2	.4	—	.4
"	22..........	32	3,040,000	8,400	18.4	57.6	13.6	9.2	1.2	—	—
"	29..........	40	3,328,800	6,000	24.	47.2	15.6	11.2	2.	—	—
August	5..........	45	4,240,000	9.000	20.8	50.	20.8	8.4	—	—	—
"	12..........	49	4,590,400	6,400	22.	55.2	13.2	9.2	.4	—	—
"	19..........	61	4,804,000	5,000	14.4	60.4	15.6	8.4	1.2	—	—

REMARKS.

June 10th, marked poikilocytosis and polychromatophilia. Macrocytes and microcytes. 88.8 normoblasts, and 29.6 megaloblasts per cu. mm.; 17th, 52 normoblasts per cu. mm.; July 1st, still poikilocytosis; not so much polychromatophilia. Many more microcytes than macrocytes. One doubtful microblast (33.6 to cu. mm.); 8th 27.2 normoblasts to cu. mm.; 15th, 32 normoblasts to cu. mm. Aug. 5th, slight poikilocytosis and polychromatophilia, some macrocytes more microcytes; 12th, very slight poikilocytosis. Few macrocytes. Many microcytes.

Treatment. Pills of Vallet's mass given in intervals.

June 10th, 4-25; 17th, many ova uncin.; 18th, 4-30; 24th, ova uncin.; 25th, 4-30; July 1st, ova uncin.; 2nd, 4-15, preceded by .03 podophyllin; 8th, ova uncin. and embryos of strong. intest.; 9th, 4-15, preceded by .03 podophyllin; 16th, ova uncin.; 17th, 4-15, preceded by .03 podophyllin; 22nd, no ova uncin.; many embryos of strong. intest.; 23rd, 4-15, preceded by .03 podophyllin; 29th, few ova uncin.; 30th, 4-15 preceded by .03 podophyllin; Aug. 4th, Blaud's pills substituted for Vallet's pills; 5th, ova uncin. Pod. .02, calomel .26, sod. sulph. 10.; 6th, ext. male fern 8., sod. sulph. 10.; 12th, very few ova uncin.; 13th, 4-15, preceded by .03 podophyllin; 19th, no ova uncin.

Result. Improved. Still has slight hemic murmur. Slight weariness and weakness.

Case 30. J. M. Jayuya. Admitted, March 29. Age, 30; male; white; single; works on coffee estates; family disease is anemia; mother and two sisters died of it. Has been sick since 12 years of age. Usual country food. Has had much mazamorra. Says he has taken medicine for his anemia ever since he was taken sick but to no purpose. Marked pallor; is fat; at times has general edema; atrophy of skin; "never can perspire." Appetite good; gastralgia; nausea; vomiting; tongue has a few pigmented spots; flatulence; tenderness epigastrium and abdomen; pronounced meteorism; bowels regular; enteralgia at times; feces normal except for many ova of uncinaria. Spleen and liver normal. At times dyspnea; palpitation; very severe precordial pain. Pulse, 97, weak, compressible; decided hemic murmur. There is such a violent supraclavicular pulsation as to make one suppose, at first sight, that he has aneurism. Severe pain in chest. Marked dizziness. ("Ave María! A terrible racket in my ears"). Frontal headache; neuralgia. Insomnia at times. Depressed and hysterical. Has fainting spells. Patellar reflex absent. Complete impotence. Suffers much from cold. Decided paresthesias. Blurred vision. Muscles very flabby, sore, and painful.

Course. A surprisingly rapid betterment. On 26th of June, taken with convulsions which lasted all day. On close questioning and observation, we found that he was suffering with congestion of the brain and hysteria. In two or three days was perfectly well.

Diagnosis. Chronic uncinariasis. Severe case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May	29..........	24	2,581,600	7,800	10.4	70.2	5.2	8.	2.2	4.	—
June	7..........	32	2,052,800	6,000	7.2	62.	17.6	6.	.4	6.	.8
"	12..........	38	3,088,800	5,400	3.6	76.4	4.4	11.6	.8	2.4	.8
"	19..........	55	4,661,600	6,200	10.8	64.4	16.4	6.	1.6	.8	—
"	26..........	75	4,457,600	7,000	1.2	77.6	10.4	10.4	—	.4	—
July	3..........	103	6,106,600	8,000	4.8	72.8	11.2	6.8	1.2	2.8	.4

REMARKS.

May 29th, blood very fluid. Coagulates slowly, Decided poikilocytosis but not so extreme as usual. Macrocytes and microcytes, latter predominating; 24.2 normoblasts per cmm. July 3, reds normal. Blood has rapidly improved.

Treatment. Blaud's pills used in intervals.

May 31st, 4-30; June 8th, ova uncin.; 9th, 4-30; 12th, ova uncin.; 16th, 4-30; 19th, ova uncin.; 20th, 4-30; 26th, bromide soda for hysterical attack .630 every 2 hrs., for 2 days; 28th, no ova uncin. but many Charcot-Leyden crystals; July 3rd, no ova uncin. Discharged from hospital.

Result. Cured. July 3rd. A powerful, ruddy man. Only symptom left is some supraclavicular pulsation.

Case 31. E. M. Barrio, Don Alonso. Admitted, May 28th. Age, 30; male; white; laborer on coffee plantations and banana patches. Three years ill. Usual food of the country. Has mazamorra every year at time of coffee crop. Has taken many iron tonics. Marked pallor; no emaciation; edema of feet and legs; general pruritus; does not perspire; no atrophy of skin but it is dry and harsh. Good appetite; gastralgia; nausea every now and then; tongue normal; flatulence; metorism; no ascites; constipated; sometimes enteralgia; feces show meat fibers, many ova of uncinaria, Charcot-Leyden crystals. Spleen and liver normal. Dyspnea; palpitation; pain in precordium; pulse, 78, weak and compressible; slight hemic murmur; marked pulsation of vessels of neck. A little cough; much pain in chest. Dizziness; tinnitus aurium; frontal headache; much insomnia; syncope at times; patellar reflex absent; is melancholy and lifeless; impotent; susceptible to cold. Urine; S. G. 1014, normal. Blurred vision. Muscles, flabby, and painful. Is very weak. Temperature 37. 6°.

Course. A furfuraceous eruption on extensor surface of forearm, dorsa of hands, and face similar to that of pellagra, developed while in hospital. Became less marked with time. Otherwise an uneventful, slow recovery.

Diagnosis. Chronic uncinariasis, severe case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
May 30..........	29	2,216,000	7,800	8.4	60.	19.6	5.6	—	6.4	—
June 7..........	31	1,984,000	7,200	6.	71.2	19.2	2.4	—	1.2	—
" 13..........	33	2,768,000	8,400	5.6	73.6	15.6	4.4	—	.8	—
" 20..........	35	3,168,000	7,400	4.4	78.	17.2	.4	—	—	—
" 27..........	44	3,224,000	7,400	4.	68.4	26.4	1.2	—	—	—
July 4..........	42	3,755,200	12,600	8.	63.6	26.	2.	.4	—	—
" 11..........	42	4,480,000	9,600	7.2	69.2	20.8	2.	—	.4	.4
" 18..........	50	3,408,000	10,400	5.2	71.2	19.6	3.6	—	.4	—
" 25..........	59	4,256,000	7,600	9.4	64.6	22.	4.	—	—	—
Aug. 2..........	63	4,064,000	8,800	11.2	65.2	21.6	2.	—	—	—
" 9..........	73	4,488,000	7,400	15.2	62.8	17.6	4.	.4	—	—
" 16..........	83	5,024,000	8,000	28.	58.	10.8	3.2	—	—	—

REMARKS.

Usual blood changes. June 20th, 29.6 normoblasts per cmm. July 11th, 38.4 normoblasts per cmm. Appearance has gradually improved until it is now about normal.

Treatment. Vallet's pills used in the intervals.

May 31st, 4-25; June 8th, ova uncin.; 9th, 4-20; 17th, ova uncin.; 18th, 4-20; 27th, few ova uncin.; 28th, 4-20; July 5th, no ova uncin.; 11th, ova uncin.; 12th, 4-20; 18th, no ova uncin.; 19th, Vallet's pills changed to Blaud's pills; 26th, no uncin.; August 2nd, no ova uncin.; Aug. 8th, no uncin.; 16th, 4-25.

Result. Practically cured, August 16th. Is strong and has no signs of disease save eruption noted. Good color.

Case 32. **B. M.** Barrio, Guaonico. Admitted, May 31. Age, 25; male; mulatto; single; laborer in country, peon on coffee estates and roads; anemia only disease in his family; father and two brothers died of it, and another is seriously ill now from same disease. Patient has been ill one and a half years. Food; rice, beans, codfish, and, at times, fresh meat. Ate well while in good health but lately, illness has prevented him from earning his bread. Much mazamorra while picking coffee. Has taken much iron. Pallor marked; has a dirty yellow color. Not emaciated and development good. Edema marked in legs and feet, and slight in face. Has general pruritus. Slight atrophy of skin which is dry and harsh. "I used to perspire when well but since I became ill, have ceased to do so." Appetite good; gastralgia; no nausea or vomiting; flatulence and tenderness of abdomen; meteorism; bowels normal; sometimes enteralgia; feces, chocolate colored, no blood nor mucus; many ova of uncinaria and ascaris; Charcot-Leyden crystals and meat fibres. Spleen and liver normal. Dyspnea; palpitation; precordial pain; pulse, 88, strong and full; heart slightly enlarged with systolic murmur. Bruit-de-diable in jugulars with violent pulsation. No pain in chest. A little cough. Great dizziness; constant buzzing in ears, and temporal headache. Sleep normal. Is downcast and hypochondrical with a bewildered air. Has fainting spells. Patellar reflex abolished. Complete impotence for one year. Suffers from cold. Urine; S. G. 1011, normal. Blurred vision. Muscles flabby and painful. Temperature 38°.

Course. Ate prodigious quantities of food and suffered from indigestion considerably. Slow case.

Diagnosis. Chronic uncinariasis, severe case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June 1..........	19	1,897,600	6,400	16.4	66.	6.8	2.8	1.6	6.4	—
" 8..........	30	2,008,000	7,600	21.2	63.2	2.4	2.8	.4	10.	—
" 15..........	31	2,136,000	6,400	46.4	40.	10.	2.	.8	.8	—
" 22..........	32	2,736,000	6,800	46.8	35.2	16.4	.8	.4	—	.4
" 29..........	28	3,155,200	10,000	38.8	36.2	16.4	4.2	.2	4.2	—
July 6..........	28	3,048,000	6,800	23.4	55.2	20.	.8	.2	.4	—
" 13..........	28	3,176,000	7,600	13.6	62.	15.6	6.	1.2	1.6	—
" 20..........	47	3,360,000	9,800	18.8	62.8	16.	2.	.4	—	—
" 27..........	52	4,392,000	10,200	19.6	58.	18.	3.6	.8	—	—
Aug. 3..........	63	4,296,000	8,800	34.4	47.2	10.4	6.4	.8	.8	—
" 10..........	67	4,730,000	9,200	36.4	44.	15.6	2.8	.8	.4	—
" 17..........	86	5,184,000	7,400	26.8	59.2	10.8	2.8	.4	—	—

REMARKS.

June 1st, blood very fluid; coagulates slowly. Poikilocytosis and polychromatophilia. Macrocytes and microcytes. August 10th, 36.8 normoblasts per cmm. August 17th, 29.6 normoblasts per cmm.

Treatment. Vallet's pills used in the intervals.

June 2nd, 4-30; 8th, ova uncin.; 9th, 4-30; 16th, no ova uncin.; 17th, 4-30; 22nd, no ova uncin.; 28th, no ova uncin.; July 6th, few ova uncin. and tricocephalus; 7th, 4-30; 13th, ova uncin.; 14th, 4-30; 20th, ova uncin.; 21st, 4-30; 27th, no ova uncin.; August 3rd, few ova uncin.; 4th, 4-15 with .03 podophyllin; 10th, 4-10 with .03 podophyllin; 17th, no ova uncin.; discharged hospital.

Results. Cured, August 17th.

Case 33. L. R. Jayuya. Admitted, May 31. Age, 12; female; white. Usual food of country. Has been sick eight years. Has mazamorra every year at coffee picking, at which she usually works. Extreme pallor. Not emaciated. Anasarca of extreme grade; even the scalp was edematous. General pruritus; never perspires. Anorexia; gastralgia; nausea; sometimes vomiting; bluish streaks on each side of tongue; flatulence; marked tenderness of epigastrium and abdomen; meteorism; ascites; distension of superficial veins of abdomen; feces, dark yellow color, liquid consistence, no blood nor mucus, many ova of uncinaria and ascaris, and Charcot-Leyden crystals. Spleen and liver much enlarged. Dyspnea; great palpitation; pain in precordium; pulse, 115, weak and dicrotic. Marked dilation of heart with marked murmurs. No cough; pain in chest. Much dizziness; constant tinnitus aurium; temporo-frontal headache; insomnia; syncope frequent; patellar reflex abolished; tactile sense blunted; great mental depression, seems stupefied; no delirium; susceptible to cold. Urine; S. G. 1012, normal. Blurred vision. Muscles flabby and painful. Great weakness, cannot stand. Temperature 38°.

Course. This patient was brought to the camp in a hammock, completely prostrated and almost moribund. Never reacted to stimulation and slowly sank, dying in comatose state as from ventricular compression.

Diagnosis. Chronic uncinariasis, extreme grade.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June 1..........	9	754,400	14,600	6.8	54.8	29.6	4.	.8	4.	—
" 8..........	15	1,232,000	11,600	20.8	69.6	2.8	2.4	.8	3.6	—

REMARKS.

Blood shows usual changes very marked in character. At both examinations, the bacillus was found.

Treatment. June 1st, and 2nd, stimulation by digitalis and nux vomica; 3rd, 2-15; 4th, Peptomangan which was kept up with digitalis and nux vomica; 10th, severe diarrhea set in, and received tanigeno; 11th, many ova uncin.; no thymol given this time. Died that night.

Result Died, June 11.

Case 34. T. G. Barrio, Sabana Grande. Admitted, June 5. Age probably 10; male; mulatto; works about the house. Mother died of anemia, lives with uncle, a patient of the Commission. About two months ago, was struck across knees, walks with difficulty on account of pain in knees. Anemia began some months ago, with weakness, pains in chest and muscles, and indigestion. Usual food of country, poor in quality. Has never been treated. Pallor marked; no emaciation; under-developed; edema of legs. Has had mazamorra. Scar from ulceration on right leg. Skin atrophied and dry. Appetite good; gastralgia; nausea; vomiting; tongue coated; slight flatulence; slight pain in abdomen and epigastrium. Bowels regular. Feces contain many ova of uncinaria. Slight dyspnea; palpitation; pain about heart. Pulse, 90, weak and compressible. Soft hemic murmur. No cough. Dizziness; tinnitus aurium; headache; sleeps well; mental condition and intelligence surprisingly good. Expression weazened. Reflexes normal; syncope. Paresthesias. No eye symptoms. Muscles painful, sore, flabby, and weak. Temperature normal.

Course. Improved slowly and steadily. Pains in knees have improved but still walks with some difficulty.

Diagnosis. Chronic uncinariasis. Marked case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June	5..........	24	3,137,600	—	20.4	62.4	4.8	6.4	1.2	3.6	1.2
“	12..........	24	3,720,000	8,600	29.2	38.4	14.	10.8	.8	6.	.8
“	19..........	31	3,737,600	7,600	31.6	44.	6.8	8.	1.6	6.8	1.2
“	26..........	34	3,590,400	7,000	18.8	61.2	8.4	10.8	.4	—	.4
July	3..........	32	3,848,800	8,000	24.	55.2	10.8	7.6	2.4	—	—
“	10..........	44	4,960,000	9,200	21.6	50.4	16.4	11.2	.4	—	—
“	17..........	46	5,075,200	7,600	14.4	62.8	9.2	12.8	.4	—	.4
“	24..........	54	4,284,000	10,400	22.	53.2	14.	10.	.8	—	—
“	31..........	55	4,910,400	5,200	20.	52.4	13.2	13.6	.8	—	—
August	7..........	58	5,222,400	9,000	14.8	59.2	15.2	10.	.8	—	—
“	14..........	60	5,760,000	8,800	10.4	60.8	14.8	12.4	1.2	.4	—
“	19..........	62	5,672,800	10,000	18.4	57.6	17.6	6.	.4	—	—

REMARKS.

June 5th, moderate poikilocytosis and polychromatophilia. Many macrocytes, less microcytes; July 17th, slight poikilocytosis and polychromatophilia. Microcytes now more abundant than macrocytes; August 19th, blood appears normal except for numerous microcytes.

Treatment. Vallet's pills, given in intervals.

June 5th, 2-15; 12th, ova uncin.; 13th, 2-15; 19th, no ova uncin.; 26th, no ova uncin.: July 3rd, no ova uncin.; 10th, no ova uncin.; 17th, no ova uncin.; 25th, few ova uncin.; 26th 2-15; 31st, few ova uncin.; Aug. 1st, 3-20, preceded by .02 podophyllin; 7th, few ova uncin.; 8th, 3-20, preceded by .02 podophyllin; 14th, no ova uncin.

Result. Greatly improved. Pains in knees improved but still walks with some difficulty.

Case 35. M. A. Barrio, Caguana. Admitted, June 7. Age, 35; male; white; unmarried; laborer on coffee and sugar plantations, and on the roads. Some members of family anemic, others not. Has had small-pox. Has been anemic many years but not severely until last year's coffee picking when he suffered greatly with mazamorra. States that he had plenty to eat until he became too sick to work. Has taken iron with temporary benefit. Pallor well marked but not extreme. Under-developed but no emaciation. Legs slightly edematous. General pruritus; scars on legs from mazamorra ulcers. Marked skin atrophy; dry; no perspiration. Appetite good; gastralgia at times; sometimes nausea and vomiting; tongue clean; no tenderness in abdomen but some over stomach. Bowels constipated. Feces contain many ova of uncinaria. Dyspnea on exertion; palpitation; sharp pain at times over heart. Pulse, 78. weak and compressible. Hemic murmur. No cough. Dizziness; tinnitus aurium; headache; sleeps well; syncope. Mental condition and intelligence good. Expression weazened and woeful. Impotent 5 years. Reflexes good. Paresthesias. Increased susceptibility to cold. Blurred vision. Muscles weak, flabby, sore, and painful. Temperature normal.

Course. Steady, though not rapid, improvement.

Diagnosis. Chronic uncinariasis; marked case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June 9..........	23	2,572,800	6,000	6.4	63.6	12.4	12.8	1.6	3.2	—
" 16..........	27	2,297,600	4,400	2.4	79.2	8.8	5.6	1.6	2.	.4
" 23	29	2,484,600	8,800	6.	77.6	8.	6.8	.8	.8	—
" 30..........	30	2,164,000	6,400	3.2	79.2	8.4	8.	1.2	—	—
July 7..........	40	3,201,600	9,400	4.	83.2	8.	4.4	.4	—	—
" 16..........	42	3,656,000	8,800	4.4	84.4	8.	2.	1.2	—	—
" 21..........	46	3,772,800	9,000	2.4	77.6	9.2	8.8	2.	—	—
" 29..........	50	3,448,000	11,600	2.	79.6	9.2	8.	.8	—	.4
August 4..........	64	4,532,800	7,200	2.8	74.8	12.4	8.4	1.2	—	.4
" 11..........	73	4,524,000	5,000	2.4	70.4	12.8	12.4	1.2	.8	—
" 18..........	77	4,960,000	4,000	5.2	61.2	24.4	8.	1.2	—	—

REMARKS.

June 9th, slight poikilocytosis and polychromatophilia. Some macrocytes and microcytes; 16th, microcytes more than macrocytes. 17.6 normoblasts per cu. mm.; 23rd, lymphocyte with basophilic granules. 18th, appearance of blood has improved steadily until it now looks normal except for microcytes.

Treatment. Vallet's pills during intervals.

June 10th, 4-25; 23rd, many ova uncin.; 24th, 4-25; July 2nd, many ova uncin.; 4-25; 7th, ova uncin.; 8th, 4-25, preceded by .03 podophyllin. Left hospital; 15th, Blaud's pills substituted for Vallet's pills. Ova uncin.; 16th 4-15, preceded by .03 podophyllin; 22nd, ova uncin.; 23rd, 4-15, preceded by .03 podophyllin; 29th, ova uncin.; 30th, 4-15, preceded by .03 podophyllin; August 4th, no ova uncin.; 11th, no ova uncin.; 19th, 4-25.

Result. Feels perfectly well. Practically cured except for slight hemic murmur.

Case 36. P. C. S. Barrio, Angeles. Admitted, June 10. Age, 16; male; white; laborer on coffee estates. Disease of family is anemia. Two brothers died of it. Has been four years sick. Usual food of country. Has had much mazamorra. Has taken much iron but in spite of this gets worse every day. Very pale. Not emaciated but under-developed. Edema of face and lower extremities. General pruritus; skin always dry; never perspires. No appetite; gastralgia; sometimes nausea and vomiting: flatulence; tenderness of abdomen; meteorism; constipation alternates with diarrhea; sometimes enteralgia. Feces normal save for many ova of uncinaria, Charcot-Leyden crystals, and meat fibres. Spleen and liver normal. Dyspnea; palpitation; precordial pain; pulse, 120, weak. Heart enlarged, blowing systolic murmur. Apex beat low and very marked. Marked pulsation in jugulars. No cough; a little pain in chest. Much dizziness; constant roaring in ears; frontal headache; sleeps well; patellar reflex absent. Tactile sense poor. Is very melancholic. Suffers from cold. Urine; S. G. 1011, normal. Blurred vision. Muscles flabby, painful, and weak. Temperature 39°.

Course. Irregular improvement, sometimes slow, at others rapid.

Diagnosis. Chronic uncinariasis. Very marked case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June 10..........	12	1,160,000	4,600	5.2	67.6	11.6	4.4	2.8	8.4	—
" 17..........	12	1,248,000	4,600	9.	70.	20.	1.	—	—	—
" 24..........	20	1,536,000	7,000	12.	60.	24.	2.4	1.2	.4	—
July 1..........	30	1,904,000	4,400	14.	66.	12.	4.	—	4.	—
" 8..........	30	2,920,000	7,400	10.	65.6	19.2	4.	1.2	—	—
" 15..........	30	2,960,000	7,200	8.4	60.	26.	2.8	2.	.4	.4
" 22..........	35	3,160,000	7,600	13.2	55.2	24.8	5.6	1.2	—	—
" 29..........	66	4,304,000	6,200	20.8	49.6	25.2	2.8	1.6	—	—
Aug. 5..........	69	4,472,000	7,000	11.2	52.	31.2	2.4	2.4	—	.8
" 12..........	86	5,096,000	7,000	7.6	72.	13.2	6.	1.2	—	—
" 18..........	101	5,136,000	7,400	8.6	72.	14.2	5.	.2	—	—

REMARKS.

Usual changes found in severe uncinariasis.

Treatment. Vallet's pills used in intervals.

June 11th, 3-20; 17th, many ova uncin.; 18th, 3-20; 25th, ova uncin.; 26th, 3-20; July 1st, ova uncin.; 2nd, 3-15, with .03 podophyllin; 8th, has had diarrhea a week; 9th, no ova uncin.; 10th. 3-15, with .03 podophyllin; 15th, no ova uncin.; 16th, changed from Vallet's pills to Blaud's; 22nd, no ova uncin.. but many Charcot-Leyden crystals; 23rd, 3-15, with .03 podophyllin. 29th, no ova uncin.; August 5th, no ova uncin.; 6th, 3-15, with .03 podophyllin; 12th, found ova uncin.; 13th, 4-15, with .03 podophyllin; 14th, discharged.

Result. Cured, Aug. 14th. A remarkable change in this boy's appearance and disposition. Color good. Is agile and strong.

Case 37. M. V. Barrio, Tetuan. Admitted, June 10. Age, 8; female; white. Sick one and a half years. Usual food of the country. Has had much mazamorra. Has taken iron tonics but without effect. Marked pallor; no emaciation; edema of legs; general pruritus; good appetite; gastralgia at times; no nausea or vomiting; flatulence; bowels constipated; sometimes enteralgia; feces normal but for many ova of uncinaria and ascaris. Charcot-Leyden crystals. Spleen and liver normal. Slight dyspnea; palpitation; precordial pain; pulse, 100, strong and full. Heart a little enlarged. Hemic murmur. Noticeable pulsation of vessels in neck. No cough but pain in chest. Much dizziness. Such roaring in ears as to prevent sleep. Frontal headache. Insomnia. Patellar reflex abolished. Is bewildered and downcast. Susceptible to cold. Urine; S. G. 1012, normal. Blurred vision. Muscles flabby and weak. Temperature 38.5°.

Course. A rapid and uneventful convalescence.

Diagnosis. Chronic uncinariasis. Severe case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June 11..........	15	2,468,000	12,600	10.	65.4	17.6	3.2	.4	3.2	—
" 18..........	16	2,112,000	7,800	8.8	60.	29.6	.8	.8	—	—
" 25..........	30	3,124,000	13,600	9.2	82.8	4.	.8	.8	2.4	—
July 2..........	28	3,088,000	16,000	9.6	67.2	15.2	1.6	2.4	4.	—
" 9..........	58	4,880,000	10,400	10.4	61.6	23.6	2.	1.6	.8	—
" 16..........	64	4,504,000	10,800	13.2	59.2	20.8	3.6	1.2	2.	—
" 23..........	75	4,968,000	13,600	16.4	58.	21.6	.8	.4	2.8	—
" 30..........	82	5,044,000	15,800	12.8	45.2	36.	3.2	.8	2.	—
August 6..........	87	6,000,000	10,400	8.4	64.2	22.8	.8	1.	2.8	—
" 13..........	100	5,168,000	11,400	4.4	70.8	21.6	1.6	1.6	—	—

REMARKS.

Blood notes not detailed, same as others of same class.

Treatment. Vallet's pills used in intervals.

June 12th, 1-10; 20th, ova uncin.; 21st, 1-15; 25th, ova uncin.; 26th, 1-15; July 2nd, ova uncin.; 3rd, 2-10, with .01 podophyllin; 9th, no ova uncin.; 16th, no ova uncin.; 23rd. no ova uncin.; 30th, no ova uncin.; Aug. 6th, no ova uncin.; discharged, Aug. 7th.

Result. Cured, Aug. 13th. Perfectly well.

Case 38. M. A. M. Barrio, Guaonico. Admitted, June 12. Age, 25; female; white; married; housewife and coffee-picker. Has had small-pox; 24 days ago, aborted during 6th month of pregnancy. Anemia began about 9 months ago with weariness, pains in joints, and indigestion. Usual vegetable diet. Has taken some medicine from city dispensary; had little effect, Extreme pallor. No emaciation. Well developed. Edema of trunk and lower extremities. Says she never had mazamorra. Some pruritus; skin atrophied and dry. Appetite good; gastralgia; nausea; vomiting; tongue brownish; flatulence; meteorism; pain in abdomen and over stomach. Slight ascites. Alternating diarrhea and constipation. Feces contain slight amount of mucus and great many ova of uncinaria and ascaris lumbricoides. Dyspnea; palpitation; pain about heart. Pulse, 96, weak and compressible; soft, purring, hemic murmur, pulsation very marked in neck. No cough. Dizziness; tinnitus aurium; daily headaches, sleeps well; reflexes abolished. Mental condition, intelligence, and expression, good. Paresthesias. Blurred vision. Looking fixedly in the eyes caused dizziness. Muscular system so weak that she could scarcely walk. Temperature normal.

Course. Very rapid at first, then slower but steady improvement. Very difficult to expel last few uncinariæ.

Diagnosis. Acute uncinariasis. Very marked case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June 13..........	10	880,000	8,600	.8	75.6	6.	12.	2.8	2.8	—
" 20..........	14	1,374,400	8,800	2.	75.2	10.4	8.8	2.8	.4	.4
" 27..........	29	2,128,800	6,400	4.	75.2	10.4	9.6	.8	—	—
July 4..........	41	2,550,400	7,600	9.2	70.4	11.6	6.	1.2	1.6	—
" 11..........	53	3,652,800	6,200	4.8	68.4	16.8	9.2	.8	—	—
" 18..........	57	3,808,800	4,400	7.2	68.	11.6	11.2	2.	—	—
" 25..........	61	4,120,000	4,000	3.2	79.6	8.8	7.2	1.2	—	—
August 1..........	65	3,850,400	9,400	6.	78.4	9.6	4.4	1.6	—	—
" 8..........	71	4,168,800	5,800	4.	74.	14.8	6.8	.4	—	—
" 15..........	76	4,781,600	10,200	.4	80.4	10.4	8.4	.4	—	—
" 19..........	85	5,354,400	5,200	1.6	84.8	8.	5.2	.4	—	—

REMARKS.

June 13th, blood watery and coagulates slowly. Marked poikilocytosis and polychromatophilia. Macrocytes and microcytes about equal. 20th, 35.2 normoblasts to cu. mm. 27th, microcytes more numerous than macrocytes. 25.6 megaloblasts and 25.6 normoblasts to cu. mm. June 4th, most remarkable improvement during the week. 18th, blood only slightly abnormal. 19th, blood normal except for some microcytes.

Treatment. Vallet's pills given in intervals.

June 14th. tr. digitalis and tr. nux vomica; 15th, 4-25; 20th, many ova uncin.; 21st, 4-25; 28th, ova uncin.; 29th, 4-25; improving very rapidly; July 2nd, stopped digitalis; 5th, many ova uncin.; 6th, 4-15, preceded by .03 podophyllin; 11th, ova uncin.; 12th, thymol as previously; 18th, many ova uncin.; 19th, thymol as previously; 25th, many ova uncin.; 26th, thymol as previously; 27th, nux vomica and Vallet's pills stopped. Blaud's pills given. August 1st ova uncin.; 2nd, calomel .26, podophyllin .02; 3rd, male fern 8. sod. sulphate 10. Says that it made her more dizzy and sicker than the thymol did. Passed no worms; 9th, ova uncin.; 10th, thymol as previously; 11th, went home; 15th, ova uncin.; 16th, 4-25; 19th, no specimen feces.

Result. Cured. No heart murmur. Feels perfectly well.

Case 39. R. R. Barrio, Guaonico. Admitted, June 12. Age, 35; male; white; married; laborer on coffee and banana plantations. Father died of anemia, 12 years ago, also 4 brothers later. Was in good health before last coffee picking but began to sicken before picking stopped. Had mazamorra while at this work. Sickness began with weariness, pains in joints, and indigestion. Food, usual, about same before as after became sick. Treated at Utuado in city hospital. Took some powders which gave benefit for a time. Pallor very marked; no emaciation; development good. Edema of legs and feet; pruritus; slight skin atrophy; marked dryness; no sweating. Appetite good; gastralgia; nausea; vomiting; tongue, white-coated; flatulence; meteorism; enteralgia; tenderness over stomach and abdomen. Alternating diarrhea and constipation. Feces contain many ova of uncinaria. Slight dyspnea; palpitation; pain over heart. Pulse, 108, weak and compressible; heart not enlarged; pronounced hemic murmur. No cough. Dizziness; tinnitus aurium; headache; sleeps well; fainting spells. Mental condition and intelligence fair. Expression sad and melancholic. Reflexes diminished. Paresthesias. No eye symptoms. Muscles flabby, painful, and very weak. Temperature, normal.

Course. Progressed very slowly at first, then very rapidly after expulsion of all parasites.

Diagnosis. Acute uncinariasis. Very marked case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June 13..........	13	1,820,800	6,600	1.2	84.8	4.4	5.2	2.	2.	.4
“ 20..........	15	1,777,600	7,400	1.6	84.	5.6	6.8	.8	1.2	—
“ 27..........	19	2,148,400	7,400	4.8	61.6	24.8	7.2	1.6	—	—
July 4..........	20	2,835,200	7,800	7.2	72.	11.6	8.8	.4	—	—
“ 11..........	21	3,444,000	6,200	10.	70.4	12.	6.8	.8	—	—
“ 18..........	30	3,800,000	8,000	5.2	72.4	11.6	10.	.8	—	—
“ 25..........	40	4,030,400	9,200	6.	73.2	12.	8.	.8	—	—
August 1..........	55	4,092,800	6,800	7.6	65.6	19.2	7.2	.4	—	—
“ 8..........	66	5,709,600	7,600	7.6	70.8	15.6	6.	—	—	—
“ 15..........	87	5,772,800	15,600	9.2	80.4	4.8	5.2	.4	—	—
“ 19..........	92	6,088,800	7,000	12.8	73.2	9.6	4.	.4	—	—

REMARKS.

June 13th, blood watery and slow to coagulate. Well marked poikilocytosis and polychromatophilia. Macrocytes and microcytes. 52.8 normoblasts to cu. mm.; 20th, 59.2 normoblasts to cu. mm.; July 11th, blood improved somewhat. 24.8 normoblasts to cu. mm. 18th, 32 normoblasts to cu. mm. August 19th, blood appears normal.

Treatment. Vallet's pills given in intervals.

June 15th, 4-25; 20th. ova uncin.; 21st, 4-25; 27th, few ova uncin.; 28th, 4-25; July 3rd, few ova uncin.; 4th, 4-15, preceded by .03 podophyllin; 11th, few ova uncin.; 12th, thymol as previously; 18th, no ova uncin.; 25th, no ova uncin. Blaud's pill substituted for Vallet's pills. Aug. 1st, no ova uncin. 11th, left hospital.

Result. Aug. 19th. Cured except for slight hemic murmur remaining.

Case 40. M. T. Barrio, Mameyes. Admitted, June 14. Age, 20; mulatto; female; single; coffee picker. Has three brothers under treatment for anemia at clinic. Four years sick. Usual food of country. Mazamorra every coffee crop. Has taken much iron; marked pallor; no emaciation; edema of feet and legs. General pruritus. Skin dry; does not perspire. Good appetite; flatulence; tenderness of abdomen; meteorism; constipated; enteralgia; feces normal save for many ova of uncinaria, Charcot-Leyden crystals, and meat fibers. Spleen and liver normal. Dyspnea, palpitation, precordial pain. Pulse, 120, weak. Marked hemic murmur, and pulsation vessels of neck. No cough; pain in chest. Much dizziness; tinnitus aurium; temporal headache; sleep normal; patellar reflex absent; is cast down and lifeless; menstruation irregular and scanty; susceptible to cold. Urine; S. G. 1014, normal. Blurred vision. Muscles flabby and painful. Great weakness. Temperature 38.5°.

Course. Soon became so much improved as to do the general washing for the camp.

Diagnosis. Chronic uncinariasis. Severe case.

DATE.		Hb.	Red cells.	Lencocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June	15..........	21	2,264,000	5,000	15.2	58.4	5.6	4.4	2.	14.4	—
“	22..........	25	2,280,000	6,800	21.2	54.8	18.8	3.6	—	1.6	—
“	29..........	26	2,888,800	4,600	18.8	50.	24.	3.6	1.2	1.2	1.2
July	6..........	26	3,280,000	11,400	33.2	40.4	21.6	2.	1.6	1.2	—
“	13..........	26	3,392,000	9,600	20.	56.	20.8	2.8	.4	—	—
“	20..........	37	3,616,000	6,200	32.4	36.8	25.6	.4	2.8	2.	—
“	27..........	55	4,624,000	13,000	44.	39.2	15.6	1.2	—	—	—
August	4..........	64	4,712,000	10,200	36.	38.4	18.8	3.2	2.8	.8	—
“	11..........	69	5,312,000	7,600	34.4	39.6	20.	3.2	1.2	1.6	—
“	18..........	84	5,944,000	7,000	35.6	42.8	17.6	2.8	1.2	—	—

REMARKS.

Blood peculiar for absence of poikilocytosis, otherwise as usual in such cases.

Treatment. Vallet's pills used in intervals.

June 16th, 4-25; 22nd, great many ova uncin.; 23rd, 4-25; 29th, many ova uncin. and Charcot-Leyden crystals; 30th, 4-25; July 6th, ova tricocephalus and few ova uncin.; 7th, 4-25; 13th, few ova uncin.; 14th, 4-25, with .03 podophyllin; July 16th, Vallet's changed to Blaud's pills; 20th, ova uncin.; 21st, 4-10, with .03 podophyllin; 28th, no ova uncin.; Aug. 4th, no ova uncin. 5th, 4-10, with .03 podophyllin; 11th, no ova uncin.; 17th, no ova uncin. Discharged.

Result. Practically cured, August 18th. Lacks but 1% Hb. of being entirely cured for she is very well.

Case 41. M. J. V. Barrio, Arenas. Admitted, June 6. Age, 11, female, mulatto. One year ill. Usual food of the country. Has had mazamorra three times. Has taken much iron. Marked pallor. No emaciation. Edema of face, legs, and feet. General pruritus. Little appetite; gastralgia; nausea; flatulence; tenderness of abdomen; bowels, normal; sometimes enteralgia; feces, many ova of uncinaria, some of ascaris, and Charcot-Leyden crystals. Spleen and liver normal. Dyspnea; palpitation; sometimes precordial pain; pulse, 125, weak and compressible; heart dilated and murmurs present; marked pulsation of vessels of neck. Much dizziness; constant tinnitus aurium; sleep normal; patellar reflex abolished; is melancholy and lifeless; susceptible to cold. Urine; S. G. 1012, normal. Blurred vision. Muscles flabby and painful. Great weakness. Temperature 39°.

Course. Uneventful and rapid convalescence.

Diagnosis. Chronic uncinariasis. Severe grade.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June	9..........	9	1,624,000	5,800	4.8	61.2	14.8	7.2	1.6	10.4	—
"	16..........	12	1,888,000	8,800	14.4	62.4	8.4	4.4	2.4	8.	—
"	23..........	17	2,136,000	5,600	27.2	39.6	22.	4.4	2.8	3.6	.4
"	30..........	45	2,176,000	5,600	14.	48.	23.2	8.8	.4	5.6	—
July	7..........	60	4,168,000	4,600	12.	51.2	24.	7.2	1.2	1.2	3.2
"	14..........	70	4,194,000	6,800	31.6	22.4	25.2	13.2	2.	4.8	.8
"	21..........	74	4,480,000	9,200	26.4	52.4	17.6	3.2	—	.4	—
"	28..........	89	5,016,000	12,200	44.	34.	20.	1.6	—	.4	—
Aug.	5..........	101	5,120,000	9,400	26.4	52.4	17.6	3.2	—	.4	—

REMARKS.

Blood, usual changes. On the 9th of June, while counting a differential many bacilli of about the size of a colon bacillus were found. They stained blue with Jenner's stain and frequently appeared in pairs end on. They were quite abundant. No spores were seen. Repeated and careful examination of the blood from the ear, and serum from the edematous foot gave the same result. A pure culture was made, under aseptic precautions by the 3-plate method, which corresponded with others made from other edematous patients with fever. The 16th and 23rd of June, the same bacilli were noted, after which they disappeared as the edema did.

Treatment. Vallet's pills used in the intervals.

June 14th, 2-15; 24th, ova uncin.; 25th, 2-15; 26th, Vallet's pills changed to Blaud's pills; July 1st, ova uncin.; 2nd, 2-10, preceded by .02 podophyllin; 10th, no ova uncin.; 15th, ova uncin.; 16th, 2-10, with .02 podophyllin; 22nd, few ova uncin.; 23rd, 2-10, with .02 podophyllin; 28th, no ova uncin.; August 5th, ova uncin.; 6th, calomel .130, podophyllin .02 followed next morning by 3. extract of filix mas. 7th, discharged.

Result. Cured, August 14th. Is ruddy, fat, and well.

Case 42. P. C. Adjuntas. Admitted, June 15. Age, 12; male; mulatto; formerly lived in country, lately servant in town house. One brother died of anemia. Previous history very indefinite and contradictory. Food better than the average, says he never suffered from hunger. Has taken wine and iron. Pallor well marked; slight emaciation; poorly developed; edema of legs and feet. Pellegra eruption on dorsa of feet, ankles, hands, and wrists, back of neck, and bridge of nose. Ulcer on left foot. Skin atrophied and very dry. Poor appetite; gastralgia; no nausea and vomiting; tongue clean; no flatulence, ascites, nor meteorism. Slight tenderness over stomach and abdomen. Enteralgia at times. Diarrhea, passages frequent but not copious. Feces, greenish-black, containing much blood and mucus, vast numbers of ova of uncinaria, ascaris, tricocephalus, and bilharzia hematobium. Dyspnea; palpitation; no pain over heart. Pulse 120, very weak and compressible. Hemic murmur. No cough. No dizziness; tinnitus aurium; no headache. Sleeps poorly; mental condition obtunded; intelligence good; expression passive, apathetic, and timid; reflexes abolished. Paresthesias. Blurred vision. Muscles painful and weak. Temperature normal.

Course. Became worse then improved a little. Ate almost nothing and became very emaciated. On August 15th, was transferred to Arecibo hospital where he died October 11th, from bilharziosis and uncinariasis. On account of his persistent diarrhea, treatment for uncinariasis was irregular and unsatisfactory.

Diagnosis. Bilharziosis.

Concomitant diseases. Uncinariasis and pellegra.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June 17..........	31	2,844,000	17,600	2.	77.2	10.8	6.4	—	3.6	—
“ 24	27	2,508,800	12,800	1.2	76.	13.2	7.6	.4	1.6	—
July 1..........	36	2,835,200	9,600	.8	88.	7.2	3.6	.4	—	—
“ 8..........	35	2,220,800	17,200	2.	82.8	12.4	2.8	—	—	—
“ 15..........	41	2,337,600	18,400	3.2	87.2	6.8	2.8	—	—	—
“ 22..........	34	2,110,400	10,800	1.6	85.6	9.6	3.2	—	—	—
“ 29..........	40	2,604,000	15,600	.8	70.	22.4	6.	.8	—	—
August 5..........	36	1,812,800	16,600	1.2	84.8	11.2	2.4	.4	—	—
“ 12..........	34	1,891,440	11,400	.4	89.6	9.2	.8	—	—	—

REMARKS.

June 17th, blood pale; coagulates slowly. Poikilocytosis and polychromatophilia fairly well marked. Macrocytes and especially microcytes plentiful. Blood plates increased. July 1st, microcytes numerous and very small. August 12th, blood has remained practically the same, although it has fluctuated somewhat.

Treatment. Blaud's pills in intervals.

June 20th, 2-20; 24th, many ova uncin. and bilharzia; 25th, 2-20; 29th, tr. opii camph. for diarrhea; July 1st, ova uncin. and bilharzia; 2nd, 2-10, preceded by .01 podophyllin; 16th, tonic of tr. nux vom. and tr. cinch. comp. Persistent diarrhea, given tr. opii camph.; 17th, ova uncin. and bilharzia. Thymol not given on account of diarrhea; 21st, pills of camphor and opium substituted for tr. opii camph.; 22nd, given methylene blue for bilharzia; 26th, methylene blue stopped on account of causing burning in stomach; August 7th, ova uncin., none of bilharzia; 8th, 2-10, preceded by .01 podophyllin; 13th, pepsin for indigestion.

Result. August 15th, transferred to city hospital, Arecibo. Was in worse condition than on entrance. Died October 11th.

Case 43. M. V. P. Barrio, Viví Arriba. Admitted, June 18. Age, 11; female; white; picks coffee sometimes; mother and three brothers died of anemia. She has been ill one year. Usual food of the country. Fell sick after attack of mazamorra which from its severity kept her one month in bed. Has taken iron. Marked pallor; skin a dirty yellow color; no emaciation; edema of legs; general pruritus. Good appetite; gastralgia sometimes; flatulence; constipation; sometimes enteralgia; feces show many ova of uncinaria and ascaris, Charcot-Leyden crystals. Spleen and liver normal. No dyspnea; palpitation; pulse, 88, weak and compressible. Slight systolic murmur, hemic in character. Slightly noticeable pulsation in vessels of neck. No cough but pain in chest. Dizziness, tinnitus aurium; temporal headache very pronounced Sleep normal. Bewildered condition of mind. No fainting spells. Patellar reflex normal. Quite susceptible to cold. Urine; S. G. 1013, normal. Blurred vision. Muscles flabby and painful. Temperature 38°.

Course. Rapid convalescence.

Diagnosis. Chronic uncinariasis, severe case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June 18..........	20	1,360,000	11,000	8.6	58.4	23.6	4.4	1.4	3.6	—
" 25..........	31	3,208,000	9,600	6.8	63.2	26.4	.8	.4	—	2.4
July 2..........	50	3,928,000	7,800	8.	55.2	25.2	3.6	3.6	4.4	—
" 9..........	68	3,888,000	6,600	10.4	63.6	15.2	2.4	1.6	6.	.8
" 16..........	66	4,024,000	11,600	10.	50.8	26.	8.8	4.4	—	—
" 23..........	72	4,360,000	10,600	10.	58.8	22.8	5.2	2.8	.4	—
" 30..........	75	4,616,000	9,200	14.	50.4	22.4	7.6	2.4	1.6	1.6
Aug. 6..........	101	4,840,000	8,200	14.4	53.2	20.4	8.4	3.6	—	—

REMARKS.

June 18th, blood very fluid and coagulates slowly. Poikilocytosis, etc.

Treatment. Blaud's pills used in intervals.

June 19th, 2-15; 25th, ova of uncin.; 26th, 2-15; July 2nd, ova uncin.; 3rd, 2-10, with .02 podophyllin; 9th, ova uncin.; 10th, 2-10, with .02 podophyllin; 16th, ova uncin.; 17th, 2-10, with .02 podophyllin; 23rd, ova uncin.; 24th, 2-10, with .02 podophyllin; 30th, ova uncin.; 31st, 2-10, with .02 podophyllin, August 6th, ova uncin.; 7th, calomel .13 podophyllin .01 followed next day by extract male fern 4.; 12th, no ova uncin. Discharged.

Result. Cured, August 12th, a rapid and complete cure; child is perfectly well and ruddy.

Case 44. P. R. Barrio, Caonillas. Admitted, June 19. Age, 20; male; mulatto; single; laborer on coffee plantations; about all his family are anemic and are being treated at our clinic. One brother died of anemia some years ago. Has been ill two or three years. Usual country food. Every year during coffee picking has to lay off from 10 to 15 days on account of mazamorra. Has little faith in medicines. Moderate pallor. Has a dead gray color. Is very well nourished. Has had edema of face and lower extremities. Is just recovering from mazamorra and has ulcers on legs. No atrophy of skin. Appetite good; no gastralgia; a little nausea; flatulence; no tenderness of abdomen nor of epigastrium; meteorism: bowels regular; feces, normal except for an enormous number of uncinaria ova. Spleen and liver normal. No dyspnea; palpitation; no precordial pain; pulse,80, full but dicrotic. Decided hemic murmur. No cough but much pain in chest. Dizziness; tinnitus aurium; headache in frontal region and vertex. Is depressed. Sleeps well. No fainting spells, Patellar reflex abolished. Susceptible to cold. No paresthesias (!). Blurred vision. Muscles, flabby, sore, and painful.

Course. A rapid convalescence.

Diagnosis. Acute exacerbation of a chronic uncinariasis, marked case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June	19..........	40	3,981,600	7,400	20.8	58.	10.	6.4	3.6	.8	.4
"	26..........	46	3,381,600	5,000	23.2	54.4	11.2	7.6	3.6	—	—
July	3..........	65	4,661,600	6,400	12.	64.8	12.	9.6	1.6	—	—
"	10..........	60	5,684,000	12,600	14.4	58.4	14.8	12.	.4	—	—
"	17..........	88	6,168,880	10,200	15.6	55.2	13.2	13.2	2.4	—	.4
"	24..........	90	6,564,000	9,000	12.6	62.6	11.6	10.3	1.6	1.3	—
"	31..........	100	7,724,000	9,000	14.	67.2	8.	8.4	2.4	—	—

REMARKS.

June 19th, blood very fluid. Coagulates very slowly. Very little poikilocytosis or polychromatophilia. Macrocytes and microcytes relatively infrequent. Reds have very pale centers as in chlorosis. 26th, moderate poikilocytosis and polychromatophilia. Many macrocytes and microcytes. Cells still chlorotic and some are "stippled". Many degenerate leucocytes. July 17th, reds well formed but microcytes still numerous; a great number of blood plates. 31st, same.

Treatment. Blaud's pills used in intervals.

June 23rd, 4-20, with .02 podophyllin; 27th, many ova uncin.; 28th, same as 23rd; July 3rd, many ova uncin.: 4th, same as June 23rd; 10th, ova uncin. and a few Charcot-Leyden crystals; 11th, same as June 23rd; 17th, no ova uncin.; 25th, ova uncin.; 26th, same as June 23rd; 27th, discharged from hospital; Aug. 4th, no ova uncin.

Result. Cured, August 4th. Is a remarkably healthy, ruddy man.

Case 45. G. C. O. Barrio, Santa Rosa. Admitted, June 20. Age, 8; male; mulatto. Has been sick two years. Usual food of the country. Has had mazamorra. Has taken much iron. Very pale; no emaciation; well developed; edema of feet and legs; general pruritus. Has ceased to perspire since he has been ill. Good appetite; gastralgia; nausea; acknowledged that he ate earth; flatulence; no tenderness abdomen or epigastrium; meteorism; no ascites; bowels constipated; sometimes enteralgia; feces, normal but for many ova of uncinaria and some of ascaris. Spleen and liver normal. Dyspnea; palpitation; precordial pain; pulse, 80, weak and compressible. Slight hypertrophy of heart, and soft blowing systolic murmur. Marked pulsation in vessels of neck. No cough nor pain in chest. Dizziness; constant tinnitus aurium; frontal headache; sleep normal; is stupefied, dazed; patellar reflex abolished. Susceptible to cold. Urine; S. G. 1012, normal. Blurred vision. Muscles flabby and painful. Is very weak. Temperature 37.8°.

Course. Slow but certain convalescence.

Diagnosis. Chronic uncinariasis, severe grade.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June	20..........	16	1,776,000	7,400	4.8	62.8	22.8	5.2	1.2	3.2	—
"	27..........	18	1,768,000	6,200	9.6	60.8	25.6	2.	1.6	.4	—
July	4..........	17½	1,746,400	5,400	17.6	48.8	23.6	7.6	.8	1.2	.4
"	11..........	23½	2,120,000	4,200	12.4	44.8	34.4	8.	—	.4	—
"	18..........	24	2,240,000	5,400	12.	52.8	28.	4.4	—	2.8	—
"	25..........	20	2,256,000	5,200	18.	42.4	30.	6.8	2.	.8	—
August	1..........	31	2,448,000	5,200	14.	55.2	24.4	2.	1.2	2.4	.8
"	8..........	42	3,592,000	7,400	11.6	55.2	30.	1.2	1.2	.4	.4
"	15..........	62	3,976,000	7,600	19.2	51.6	22.4	4.4	1.6	.8	—

REMARKS.

Usual blood changes. June 27th, 49.6 normoblasts per cmm. July 11th, 16.8 normoblasts per cmm.

Treatment. Blaud's pills used in intervals.

June 22nd, 2-15; 27th, ova uncin.; 28th, 2-15; July 4th, ova uncin.; 5th, 2-15; 11th, ova uncin.; 12th, 2-15; 18th, ova uncin.; 19th, 2-15; 25th, ova uncin.; 26th, 2-15; August 1st, ova uncin.; 2nd, 2-15; 11th, no ova uncin.; 17th, no ova uncin.; 19th, no ova uncin. Left in charge of Dr. Vizcarrondo of Utuado who reports that he became ruddy, strong, and well a month thereafter.

Result. Cured, September. Hemoglobin percentage not taken.

Case 46. J. D. Barrio, Santa Rosa. Admitted, June 21. Age, 19; male; mulatto; single; laborer on coffee estates; some of his family anemic; mother, two brothers, and two uncles died of anemia. Has been sick two years. Usual country food. Has mazamorra at every coffee crop. Has taken much iron to no purpose. Moderate pallor. Skin dark gray. Is well nourished. Slight edema of feet. General pruritus. Has had ulcers from mazamorra on feet. No atrophy of skin but it is dry and harsh. Good appetite; gastralgia; nausea and vomiting; flatulence; tenderness abdomen and epigastrium; meteorism. Bowels regular; enteralgia. Feces normal save for great quantity of ova of uncinaria. Spleen and liver normal. Dyspnea; palpitation; pain in precordium. Pulse, 100, strong and full. Harsh cardiac murmur best heard at apex. Pulsation at root of neck not noticeable. Cough and pain in chest. Dizziness; tinnitus aurium. Temporal and cerebellar headache; sleeps well. Is very depressed and nervous. Seems afraid he is going to be harmed in hospital but his anxiety to receive treatment is very apparent. Complete impotence. Very susceptible to cold. Decided paresthesias in legs. Blurred vision. Muscles flabby, sore, and painful. Marked weakness.

Course. Rapid and uneventful convalescence. His expression changed from one in the depths of woe to that of a sky-larking, happy-go-lucky darky.

Diagnosis. Chronic uncinariasis of medium severity.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June 21..........	35	2,732,800	8,200	4.	64.	25.6	5.2	1.2	—	—
“ 28..........	50	4,008,800	10,400	4.8	70.8	16.4	5.2	1.2	1.6	—
July 5..........	54	4,030,400	6,400	2.8	72.8	13.2	10.4	.4	—	.4
“ 12..........	70	4,857,600	9,200	6.	56.	19.6	15.6	2.8	—	—
“ 19..........	85	6,856,000	4,000	6.	54.	22.8	15.6	1.2	.4	—
“ 26..........	104	6,310,400	5,800	4.8	58.	22.8	13.2	1.2	—	—

REMARKS.

June 21st, blood somewhat pale and fluid, coagulates slowly. Poikilocytosis decided but polychromatophilia little noted. Reds are smaller than usual, microcytes predominating although macrocytes plentiful. Pale centers and spots of degeneration as usual. Leucocytes small and poorly developed. July 5th, about same. 26th, reds normal.

Treatment. Blaud's pills used in intervals.

June 22nd, 4-20, with .02 podophyllin; 28th, ova uncin.; 29th, 4-15, with .02 podophyllin; July 4th, ova uncin.; 5th, 4-15, with .03 podophyllin; 12th, ova uncin.: 14th, same as on 5th; 19th, and 26th, no ova uncin. Discharged from hospital.

Result. Cured, July 26th. In perfect health, spirits, and color.

Case 47. J. M. B. Barrio, Tetuan. Admitted, June 21. Age, 30; male; white; married, with five children: laborer on coffee estates; wife and some of his children have anemia; some have not. He was perfectly well until last coffee crop. Food usual of country, but now poor. Previously he had enough to eat because he had a garden but is now too sick to work it. His last attack of mazamorra, he says, was terrible. Very marked pallor. Has a dirty, pasty yellow color. Has edema of feet and ulcers from mazamorra. Does not perspire. Has little appetite; gastralgia; nausea and vomiting; flatulence; great tenderness of abdomen and epigastrium; constipated; at times enteralgia; feces contain many ova of uncinaria. Spleen and liver normal. Much dyspnea; palpitation; precordial pain; pulse, 115, weak, dicrotic, and compressible *No heart murmurs.* Veins of arm stand out, pulsate, and each valve is a little elevation. Great pulsation of vessels at root of neck. Cough; no pain in chest. Dizziness; tinnitus aurium; little headache. Is profoundly convinced he is sick but deeply suspicious of the doctor and prepared for the worst. Subject to fainting spells. Patellar reflex abolished. His expression is most hopeless. Intelligence good; is an astute, hardheaded jibaro. Complete impotence, Susceptible to cold. "Hands feel asleep and tingle." Blurred vision, Muscles flabby, sore, and painful. Marked weakness.

Course. Recovery rapid. This man, without any organic lesion of heart nor albumin in urine, had a severe edema of both feet, with fever, July 3rd, which lasted 10 days. He was sent home with 70% Hb., on July 15th. On the 27th, he returned with 102% Hb. and bitterly complaining of poor vegetable food.

Diagnosis. Chronic uncinariasis. Marked case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June 22..........	32	2,195,200	5,000	10.8	66.	9.6	12.8	.8	—	—
" 29..........	62	2,768,800	7,000	4.4	76.	6.4	10.4	1.2	1.2	.4
July 6..........	60	3,360,000	7,000	7.2	65.2	20.8	5.6	.8	.4	—
" 13..........	70	4,061,600	4,000	9.2	67.2	9.6	11.6	1.6	.8	—
" 20..........	93	5,000,000	7,000	5.2	65.2	14.8	12.4	1.2	.8	.4
" 27..........	102	6,261,600	7,800	4.8	67.6	17.2	7.2	1.6	1.2	.4

REMARKS.

June 22nd, blood very fluid and coagulates slowly. Polychromatophilia absent. Moderate poikilocytosis. 29th, many macrocytes; fewer microcytes; now decided polychromatophilia July 6th, marked polychromatophilia, but poikilocytosis hardly perceptible. Few macrocytes and microcytes. 13th, several "stippled" reds; many degenerated leucocytes, 20th, many degenerated leucocytes, reds nearly normal. 27th, reds normal.

Treatment. Blaud's pills used in intervals.

June 23rd, 4-15, with .03 of podophyllin; 29th, few ova uncin. and many Charcot-Leyden crystals; 30th, same as 23rd. For three days had paregoric for diarrhea. July 6th, and 13th, no ova uncin. Discharged hospital.

Result. Cured, July 27th. Is perfectly well and has good color.

Case 48. R. G. Barrio, Rio Abajo. Admitted, June 20. Age 28; male; white; married; laborer on coffee and banana plantations. Brother anemic, mother in fair health. Father and three brothers and sisters died of anemia. Has been anemic for some years, gradually getting worse. Had mazamorra each year during coffee picking. Usual food, says that he does not eat as much as he has to eat because it gives him indigestion. Took some "iron powders" but quit as they did him no good. Pallor very marked; slightly emaciated (probably due to indigestion). Development good. Says he has had edema of face, trunk, and extremities, none at present. General pruritus; no ulceration; skin atrophied and dry. Appetite fair; gastralgia; constant nausea: vomiting, almost every day; tongue clean; flatulence; meteorism; pain and tenderness marked over stomach and abdomen. Bowels constipated; feces contain a great abundance of ova of uncinaria. Dyspnea; marked palpitation; precordial pain. Pulse, 90, fairly strong. Soft hemic murmur at base and apex. Heart symptoms more pronounced than in some other cases with greater anemia. Dizziness; tinnitus aurium; headache and sometimes neuralgia; sleeps poorly; fainting spells; reflexes slightly exaggerated. Mental condition and intelligence good; expression fair; impotence; increased susceptibility to cold. Paresthesias. Blurred vision. Muscles painful, flabby, and weak. Temperature normal.

Course. As a general rule, improved rapidly, although blood record twice shows fall in hemoglobin followed by rapid rise.

Diagnosis. Chronic uncinariasis. Marked case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June	21..........	26	2,517,600	4,800	26.	42.4	12.8	15.2	.4	3.2	—
"	28	35	3,261,600	6,200	12.8	70.4	6.	10.4	.4	—	—
July	5..........	45	5,492,800	5.600	19.6	50.	16.	13.2	.8	—	.4
"	12..........	40	4,777,600	7,000	19.6	62.8	11.6	5.6	.4	—	—
"	19..........	67	6,252,800	10,200	25.2	44.8	14.8	11.6	2.8	.8	—
"	26..........	80	6,266,400	9,000	33.6	35.2	19.6	10.	.4	1.2	—
August	2..........	88	6,786,400	6,000	20.8	55.6	12.4	10.4	.4	.4	—
"	10..........	80	6,555,200	7,600	26.4	50.4	13.6	9.2	.4	—	—
"	17..........	102	7,008,800	7,200	29.2	46.8	15.2	7.6	1.2	—	—

REMARKS.

June 21st, macroscopic appearance of blood fair. Moderate poikilocytosis and polychromatophilia. Some macrocytes and microcytes, about equal in number. 19.2 normoblasts to cu. mm. 28th, 49.6 normoblasts to cu. mm. July 5th, less poikilocytosis and polychromatophilia. Microcytes more numerous than macrocytes. 67.2 normoblasts to cu. mm. 12th, 28 normoblasts; 26th, blood appears much improved. Microcytes still numerous. Aug. 10th, blood appears normal except for some microcytes.

Treatment. Blaud's pills given during intervals.

June 22nd, 4-15, preceded by .03 podophyllin; 28th, many ova uncin.; 29th, 4-20, preceded by .02 podophyllin; July 6th, ova uncin.; 7th, thymol as previously; 9th, Dover's powder for diarrhea and irritative cough; 12th, ova uncin.; 13th, 4-10, preceded by .02 podophyllin; 19th, few ova uncin.; 20th, thymol as previously; 26th, few ova uncin.; 27th, thymol as previously; August 2nd, few ova uncin.; 3rd, 4-25; 10th, no ova uncin.; 11th, 4-25; 17th, no specimen of feces.

Result. August 17th, cured. Complains of slight indigestion. No heart murmur.

Case 49. A. G. Barrio, Arenas. Admitted, June 25. Age, 13, male; white. Sister in hospital here for same disease. Another sister and brothers very anemic. Has been sick 3 years. Usual food of the country. Has had much mazamorra. Has taken much iron. Extreme pallor; no emaciation. Once had general edema. Atrophy of skin, which is dry and perspires very little. Good appetite; gastralgia; nausea and vomiting; tenderness of abdomen and epigastrium; meteorism; bowels regular; enteralgia; feces show an enormous number of ova of uncinaria. Spleen and liver normal. No dyspnea nor precordial pain. Pulse, 125, weak and compressible. No heart murmur. No marked pulsation of vessels of neck. No cough nor pain in chest. Dizziness; tinnitus aurium; frequent temporal headache. Sleeps well. Is depressed and lifeless. Has had fainting spell. Patellar reflex diminished. Has no paresthesias. No disturbances of vision. Muscles, flabby, sore, and painful. Is very weak.

Course. Rapid and uneventful recovery.

Diagnosis. Chronic uncinariasis, marked case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June 28	26	2,284,000	5,800	11.2	48.	29.6	10.	1.2	—	—
July 5	32	3,524,000	8,200	6.	49.6	31.6	12.4	.4	—	—
“ 12	45	4,706,400	19,600	6.8	54.8	20.	16.	2.	.4	—
“ 19	60	4,556,000	9,400	4.8	41.2	32.8	20.	1.2	—	—
“ 26	70	4,888,800	8,200	11.2	43.6	26.	16.4	2.8	—	—
Aug. 2	80	4,817,600	12,600	11.2	59.2	15.6	12.	.4	1.6	—
“ 9	77	4,684,000	9,400	17.2	47.6	22.	11.2	1.6	.4	—
“ 20	87	—	—	—	—	—	—	—	—	—

REMARKS.

June 28th, blood very fluid, coagulatse slowly. Great poikilocytosis and polychromatophilia. Many macrocytes and microcytes. July 5th, reds same as above. 12th, reds improving. 26th, reds nearly normal.

Treatment. Blaud's pills used in intervals.

June 28th, 2-10, with .03 podophyllin; July 5th, ova uncin.; 6th, same as June 28th; 12th, ova uncin.; 13th, same as June 28th; 19th, few ova uncin.; 20th, same as June 28th; 26th, ova uncin.; 27th, same as June 28th; August 2nd, no ova uncin. Discharged from hospital with 80% Hb.

Results. Cured, August 20: a healthy, ruddy boy.

Case 50. M. H. V. Barrio, Viví Arriba. Admitted, June 22. Age, 13; male; white; works on coffee plantation. Anemia is a family disease. One sister died of it. He has been sick four years. Food, poor. Has had mazamorra frequently. Has taken iron tonics but to no purpose. Very pale: emaciated; no edema; general pruritus at times; skin dry; slight atrophy of skin. Appetite good: gastralgia; nausea and vomiting at times; tenderness in epigastrium; enteralgia; bowels regular; feces, light greenish gray, undigested food, mucus, many ova of uncinaria and ascaris. Spleen and liver enlarged. Dyspnea; palpitation; pulse, 128, strong and full. Pulsation marked in jugulars and arteries of neck. Hemic murmur; no cough; pain in chest. Dizziness; tinnitus aurium; frontal headache; insomnia; is very depressed and lifeless. Patellar reflex diminished. Suffers from cold. Paresthesias of feet. Blurred vision. Muscles flabby. Great weakness. Temperature 39.2°.

Course. Uneventful and rapid recovery.

Diagnosis. Chronic uncinariasis, severe grade.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June 22..........	27	2,080,000	15,200	2.4	79.2	14.	3.6	.8	—	—
" 29..........	43	2,200,000	11,600	15.2	63.6	10.8	8.8	1.2	.4	—
July 6..........	75	4,741,600	12,000	16.	53.2	20.8	8.	1.2	.8	—
" 13..........	60	3,406,400	7,000	16.4	55.2	16.8	9.6	2.	—	—
" 20..........	91	4,692,800	6,400	24.8	44.	14.8	14.8	1.6	—	—
" 27..........	102	5,832,800	7,600	18.8	58.8	12.	6.8	3.2	.4	—

REMARKS.

June 22nd, blood very fluid; coagulates slowly. Great poikilocytosis and polychromatophilia; macrocytes and microcytes in large numbers; 121.6 megaloblasts, 60.8 normoblasts per cmm. Blood is a picture of pernicious anemia. 29th, many more macrocytes than microcytes. 11.6 normoblasts per cmm. July 6th, great macrocytosis; many degenerated leucocytes. 13th, reds much improved; little macrocytosis. 20th, reds nearly normal.

Treatment. Blaud's pills used in intervals.

June 23rd, thymol 2, podophyllin .02; 29th, many ova uncin. and ascaris, and great number of Charcot-Leyden crystals; 30th, same as 23rd; July 7th, ova uncin.; 8th, 2-15, with .02 podophyllin; 13th, many ova uncin.; 14th, same as 8th; 20th, ova uncin.; 21st, same as 8th; 27th, ova uncin.; 28th, same as 8th. Discharged from hospital. August 7th, no ova uncin.

Result. Cured, August 7th. Boy cheerful and entirely well, with good red color.

Case 51. F. R. Barrio, Jayuya Arriba. Admitted, June 22. Age, 30; male; white; unmarried; laborer on coffee, banana, and sugar plantations. Father died of anemia, 2½ months ago; of other members of family, three have anemia, two have not. Says he has always been pallid and weak. Has taken iron tonics with little benefit. Extreme pallor; no emaciation; well developed. Slight edema of feet; has had various attacks of mazamorra; general pruritus; ulcer on right leg; marked atrophy of skin, dry and finely wrinkled. Good appetite; no gastralgia; no nausea or vomiting; tongue clean; flatulence; meteorism; tenderness over abdomen but not over stomach; alternating constipation and diarrhea. Feces contain numerous ova of uncinaria. Dyspnea; marked palpitation; precordial pain. Pulse, 88; full and fairly strong; slight hemic murmur. No cough. Dizziness; tinnitus aurium; headache; sleep variable; fainting spells; reflexes somewhat exaggerated. Mental condition and intelligence good. Expression old, drawn, and pinched, appears about 50 years old. Impotent, increased susceptibility to heat and cold. Paresthesias. No eye symptoms. Muscles very flabby, weak, and painful. Temperature normal. Says he frequently has fever at night.

Course. Rapid improvement at first, then very slow. Remarkable improvement in skin.

Diagnosis. Chronic uncinariasis. Marked case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June	22..........	20	2,160,000	6,000	6.	64.4	12.8	13.2	2.	1.6	—
"	29..........	30	3,709,600	10,600	16.	62.8	11.6	7.6.	2.	—	—
July	6..........	38	3,124,000	9,200	15.6	68.	9.6	6.	.8	—	—
"	13..........	50	3,466,400	9,800	10.4	73.6	10.	4.4	1.6	—	—
"	20..........	70	3,670,400	5,600	18.	60.	12.4	8.8	.8	—	—
"	27..........	88	4,746,400	4,400	12.4	66.	14.	6.4	1.2	—	—
August	3..........	80	5,261,600	8,800	3.2	84.8	8.8	3.2	—	—	—
"	10..........	83	5,524,000	4,200	4.4	73.6	12.8	8.4	.8	—	—

REMARKS.

June 22nd, blood drop pale. Coagulates slowly. Marked poikilocytosis and polychromatophilia. Macrocytes and microcytes. Few oval forms; 29th, 84.8 normoblasts per cu. mm. July 6th, 36.8 normoblasts per cu. mm. 13th, 39.2 normoblasts per cu. mm. Blood much improved; August 10th, reds appear swollen, and show slight poikilocytosis and polychromatophilia. Many microcytes. Few macrocytes.

Treatment. Blaud's pills given during intervals.

June 23rd, 4-20, preceded by .03 podophyllin; 29th, many ova uncin. and ascaris lumbricoides; 30th, thymol as previously; July 6th, ova uncin.; 7th, thymol as previously; 13th, ova uncin.; 14th, thymol as previously; 20th, ova uncin.; 21st, thymol as previously; 27th, no ova uncin. Left hospital. August 3rd, no ova uncin.; 4th, thymol as previously; 10th, few ova uncin.; 11th, thymol repeated.

Result. Practically cured. No heart murmur. Twice walked into camp from home, a six hours trip, without more than ordinary fatigue.

Case 52. D. R. Barrio, Rio Abajo. Admitted, June 22. Age, 15; female; mulatto; unmarried; occupation, housework and coffee picking. Parents in fair health, one sister anemic. Has been sick three or four months. Food, usual, with codfish occasionally. Has taken medicine from city dispensary, without appreciable benefit. Pallor marked but still shows faint color in mucous membranes. General development good, no emaciation. Has had edema of feet, none now. Has had much mazamorra; general pruritus; skin dry and slightly atrophied. Appetite good; gastralgia; nausea but no vomiting; tongue coated; tenderness over stomach and abdomen; no flatulence, meteorism, nor ascites. Alternating diarrhea and constipation. Feces contain a moderate number of ova of uncinaria, and ascaris. Dyspnea; palpitation; precordial pain. Pulse, 108, weak and compressible. Hemic murmur well marked. No cardiac dilatation. Dizziness, tinnitus aurium; headache and sometimes neuralgia; sleep variable; syncope; reflexes slightly diminished. Mental condition stupid; intelligence only fair; expression passive, not as bad as usual; amenorrhea. Paresthesias. No eye symptoms. Muscles not flabby but painful and weak. Temperature normal.

Course. Rapid improvement in physical and mental condition especially after expulsion of all uncinariæ.

Diagnosis. Acute uncinariasis, marked case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June	22..........	25	3,741,600	13,400	20.4	50.	17.2	.8	1.6	2.	.8
"	29..........	31	2,897,600	6,000	6.8	76.8	11.6	4.4	.4	—	—
July	6..........	45	3,888,000	14,000	14.8	67.2	12.	5.2	.8	—	—
"	13..........	53	4,314,400	7,600	14.8	58.4	16.4	8.4	2.	—	—
"	20..........	76	5,386,400	12,200	8.8	72.	9.6	8.8	.8	—	—
"	27..........	100	5,320,000	8,000	22.	54.	15.2	8.	.8	—	—

REMARKS.

June 22nd, blood drop appears slightly pale. Moderate poikilocytosis and polychromatophilia. More macrocytes than microcytes. July 6th, microcytes have become more numerous than macrocytes. 27th, reds have improved steadily and now appear normal.

Treatment. Blaud's pills used in intervals.

June 23rd, 4-15, preceded by .03 podophyllin; 29th, ova uncin., few of ascaris and trichocephalus; 30th, thymol as on 23rd; July 6th, no ova uncin., few of ascaris; 13th, no ova uncin. nor of ascaris; 20th, no ova uncin., one larva strong. intest.; 29th, no ova uncin.

Result. Rapid cure. Hemic murmur disappeared and menstruation returned.

Case 53. J. P. C. Barrio, Caniaco. Admitted, June 23. Age, 12; male; white; coffee picker, and servant. Mother and one brother in good health; father and another brother died of anemia. Has been sick 5 months. Food is the same as mother and brother who have no anemia. Has taken some quinine. Pallor of mucous membranes marked; of face, fair. Good general development; no emaciation; no edema. Has had mazamorra. General pruritus; skin atrophied and dry. Good appetite; gastralgia; nausea; vomiting. Tongue has brown coat; no flatulence; no meteorism; no pain or tenderness of abdomen. Bowels regular. Feces contain a moderate number of ova of uncinaria, and many Charcot-Leyden crystals. No dyspnea nor precordial pain, but some palpitation. Pulse, 102, fairly strong, but compressible. Soft hemic murmur. Dizziness; tinnitus aurium; headache; sleeps well. Reflexes abolished; mental condition very dull; intelligence poor; expression, frightened. No paresthesia. Vision blurred. Muscles weak, but not flabby nor painful.

Course. Rapid improvement. Became active, more intelligent, and very mischievous.

Diagnosis. Acute uncinariasis. Marked case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June	23..........	25	4,128,000	6,200	7.6	65.2	15.2	10.8	8.	.4	—
"	30..........	29	3,772,800	11,800	8.	68.8	10.4	12.	—	—	.8
July	7..........	55	4,737,600	11,800	8.8	66.	16.8	8.	.4	—	—
"	14..........	85	5,337,600	11,200	9.6	69.2	13.2	8.	—	—	—
"	21..........	81	5,346,400	4,600	6.	63.2	14.4	15.2	.8	.4	—
"	28..........	70	4,372,800	5,000	8.	54.	23.6	14.	—	.4	—
Aug.	4..........	95	5,594,400	4,400	7.6	66.4	17.6	8.	.4	—	—
"	11..........	109	6,097,600	8,000	8.	64.	20.	7.6	.4	—	—

REMARKS.

June 23rd, blood drop slightly paler than normal. Marked poikilocytosis and polychromatophilia. More microcytes and macrocytes. August 4th, reds appear normal. Has improved steadily. Microcytosis was always prominent.

Treatment. Blaud's pills used during intervals.

June 28th, 3-15, preceded by .03 podophyllin; 30th, ova uncin. (2nd day after thymol); July 1st, thymol as previously; 7th, no ova uncin.; 8th, no ova uncin.; 14th, few ova uncin.; 15th, thymol as previously; 20th, no ova uncin.; 27th, no ova uncin.; 29th, thymol as previously; August 4th, few ova uncin.; 5th, calomel .13, podophyllin .02, filix mas 8., sod. sulph. 10.; 11th, no ova uncin

Result. Cured. No heart murmur nor other symptom. Has fine color.

Case 54. D. G. Barrio, Caguana. Admitted, June 22. Age, 16; male; mulatto; laborer on coffee plantations. Anemia is a family disease. Sick one year. Usual food of country. Has had mazamorra. Has taken iron tonics. Pronounced pallor with a puffy look in face. Skin gray, not emaciated; no edema save of face. General pruritus; dry skin. Appetite good; gastralgia; nausea; no vomiting; tenderness of abdomen and epigastrium; meteorism. Bowels regular; no enteralgia. Feces contain many ova of uncinaria and tricocephalus. Spleen and liver enlarged. Dyspnea; palpitation; precordial pain; pulse, 96, weak and compressible. Hemic murmur. Dizziness; tinnitus aurium; headache; insomnia; syncope; reflexes normal; expression is lifeless. Muscles flabby, sore, and painful. Is weak. Temp. 37.5°.

Course. Rapid and uneventful recovery.

Diagnosis. Chronic uncinariasis. Moderate severity.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June 24..........	40	4,336,000	4,200	17.	19.5	35.	28.5	—	—	—
July 1..........	34	3,528,000	5,000	24.4	40.4	22.8	12.	.4	—	—
“ 8..........	55	4,080,000	6,800	26.8	44.	16.8	12.4	—	—	—
“ 15..........	71	4,261,600	6,400	22.8	41.2	19.6	16.4	—	—	—
“ 22..........	78	4,240,000	5,400	22.4	42.4	21.6	13.6	—	—	—
“ 29..........	104	5,506,000	5,800	35.2	34.	16.	14.8	—	—	—

REMARKS.

June 24th, blood very fluid and slow to coagulate. Great poikilocytosis and polychromatophilia; enormous macrocytes; 16.8 normoblasts per cmm. July 1st, still great macrocytosis. 15th, polychromatophilia and poikilocytosis still very marked but macrocytosis abating. 22nd, wonderful improvement in reds. 29th, reds practically normal.

Treatment. Blaud's pills used in the intervals.

June 26th, .03 of podophyllin, with 15 sod. sulphate; no uncin. expelled; 27th, many ova of uncin.; 28th, 2-10, with .03 podophyllin; July 1st, many ova uncin.; 2nd, same as June 28th; 8th, many ova uncin.; 9th, same as June 28th; 15th, ova uncin.; 16th, same as June 28th; 22nd, few ova uncin.; 23rd, same as June 28th; 29th, ova uncin.; 30th, same as June 28th; August 11th, no ova uncin. Discharged from hospital.

Result. Cured, August 11th. Boy is healthy and strong.

Case 55. E. C. Barrio, Sabana Grande. Admitted, June 23. Age, 12; male; white; two years sick; usual food of country; mazamorra; has taken much iron; pallor marked; no edema; dry skin. Good appetite; no gastralgia; no nausea or vomiting; tenderness in epigastrium; meteorism; bowels regular; feces, only abnormality is large quantity of ova of uncinaria. Spleen and liver enlarged. No dyspnea; no palpitation; no precordial pain. Pulse 76, weak and wiry. Intense hemic murmur; no cough nor pain in chest. Dizziness; tinnitus aurium; headache; sleep normal; patellar reflex diminished. Expression indifferent and lifeless. Muscles flabby and painful. Great weakness. Temperature 37.6°.

Course. Uneventful rapid convalescence.

Diagnosis. Chronic uncinariasis in which an acute attack is just about developing.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June	24..........	39	2,560,000	5,400	26.4	30.8	28.	12.8	1.6	.4	—
July	1..........	34	3,296,000	12,400	22.8	49.4	19.2	7.	1.2	—	.4
"	8..........	43	3,106,400	11,800	28.8	47.6	15.2	7.2	.8	—	.4
"	15..........	60	4,164,000	10,000	19.2	41.6	23.2	11.6	1.2	3.2	—
"	22..........	63	5,248,000	11,200	13.3	35.7	22.6	26.	1.	1.4	—
"	29..........	73	4,772,800	11,000	14.8	45.6	23.2	12.	2.4	2.	—
August	5..........	100	5,368,800	15,600	11.6	66.	10.	11.6	.8	—	—

REMARKS.

June 24th, blood very fluid and coagulates slowly. Corpuscles fairly well formed. Leucocytes degenerated and eosinophiles large; 43.2 normoblasts per cmm. Decided macrocytosis; polychromatophilia. July 1st, great polychromatophilia and macrocytosis. Some macrocytes are enormous; poikilocytosis; 74.4 megaloblasts and 173.6 normoblasts per cmm. Two normoblasts in process of mitosis. Eosinophiles large and leucocytes degenerated. Some polymorphonuclears lack granules, others have large granules, and these cells are of all sizes. July 8th, reds better formed but many macrocytes and microcytes. Little poikilocytosis and much polychromatophilia. 15th, reds well formed but still macrocytes, microcytes, polychromatophilia and a little poikilocytosis. August 5th, blood normal.

Treatment. Blaud's pills used in intervals.

June 26th, .02 podophyllin and 15. sod. sulphat. no worms expelled; June 28th, 2-10, and .02 podophyllin; many uncinariæ expelled; July 1st, ova uncin.; July 2nd, same as June 28th, 8th, ova uncin. and a few Charcot-Leyden crystals; 9th, same as June 28th; 15th, ova uncin.; 16th, same as June 28th; 22nd, no ova uncin.; 30th no ova uncin.; 31st, same as June 28; 5th, no ova uncin. Discharged.

Result. Cured, August 5th. Fat well, and rosy.

Case 56. J. G. Barrio, Caniaco. Admitted, June 25. Age, 23; male; white; unmarried laborer on coffee plantations, Nearly all of family have anemia; some have died of it. He has been sick several years. Has taken "iron powders" without benefit. Pallor well marked; not emaciated; general development good. Has suffered much with mazamorra. No edema; slight pruritus; skin atrophied, very dry, and harsh. Says he never sweats "a single drop". Good appetite; no gastralgia; no nausea; no vomiting; tongue clean; slight tenderness over stomach and abdomen; no flatulence, meteorism, or ascites. Bowels regular; no enteralgia; feces contain great many ova of uncinaria. Liver and spleen normal. Slight dyspnea; palpitation; sometimes precordial pain. Pulse, 78, full and fairly strong. No hemic murmur. Slight cough, no pain in chest. Dizziness; tinnitus aurium; slight headache; sleep good; subject to syncope; reflexes abolished; intelligence good; mental condition dull; expression, morose and apathetic. Impotent, susceptible to cold; paresthesias. No eye symptoms. Muscles weak and painful; joint pains. Temperature normal.

Course. Steady improvement. This man assisted the camp scavenger, and soon informed us that he was better, calling attention to his profuse sweating while at work, as an evidence of that fact.

Diagnosis. Chronic uncinariasis. Marked case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June 25	33	3,221,600	6,000	13.6	63.2	6.	13.6	.8	2.	.8
July 2	39	3,128,000	7,200	8.8	72.4	10.8	7.6	.4	—	—
" 9	59	3,395,200	8,200	16.4	62.	13.2	8.	.4	—	—
" 16	64	4,664,000	4,800	28.	54.	12.4	4.	1.6	—	—
" 23	72	4,195,200	7,000	16.4	66.8	6.8	9.6	.4	—	—
" 30	77	4,301,600	8,800	19.2	63.6	11.6	4.8	.8	—	—
August 6	97	6,061,600	11,000	20.4	60.4	10.8	8.4	—	—	—
" 13	94	5,686,400	10,200	17.6	65.2	11.2	6.	—	—	—
" 19	103	5,484,000	9,400	13.6	66.	16.	4.4	—	—	—

REMARKS.

June 25th, macroscopic appearance of blood is fair. Microscopically shows poikilocytosis and marked polychromatophilia. Macrocytes are extremely large, about equal in number to microcytes. July 9th, appearance of blood much better than last week. August 6th, reds are practically normal.

Treatment. Blaud's pills used in intervals.

June 27th, 4-20, preceded by .03 podophyllin; July 3rd, many ova uncin.; 4th, thymol as previously; 9th, many ova uncin.; 10th, thymol as previously; 17th, ova uncin.; 18th, thymol as previously; 23rd, ova uncin.; 24th, thymol as previously; 30th, ova uncin.; 31st, ext. filix mas 8., preceded by .26 calomel and .02 podophyllin. Passed many uncinariæ. August 6th, ova uncin.; 7th, filix mas repeated in same manner; 13th, ova uncin.; filix mas repeated; 19th, very few ova uncin. Left camp without taking anthelmintic.

Result. Cured in regard to his anemia but still retains a few uncinariæ.

Case 57. U. M. Utuado. Admitted, June 27. Outpatient. Age, 12; female; white; schoolgirl. Family (3 in number) all have anemia. She has always been pale and sickly. Previous disease, measles. Food good now, formerly poor. Has taken purgatives. Slight pallor; no emaciation; well developed. Has had slight edema of ankles. Had mazamorra and resulting small ulcer on leg. General pruritus; skin not atrophied nor dry. Good appetite; gastralgia: nausea; vomiting; flatulence; meteorism; tenderness over stomach and abdomen. Slight diarrhea, feces contain many ova of uncinaria. Dyspnea on exertion: palpitation; pain in precordium; pulse, 99, full and strong; distinct hemic murmur. No cough; slight pain in chest. Dizziness; tinnitus aurium; headache; sleeps well. Mental condition, very good; intelligence, very bright; expression, pleasant; reflexes abolished; paresthesias. No eye symptoms. Muscles sore and somewhat weak. Temperature normal.

Course. Regular improvement except for an attack of malarial fever which caused a slight set-back.

Diagnosis. Chronic uncinariasis. Moderate case.

Complication. Tertian intermittent malarial fever.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June 27..........	56	5,025,600	12,600	14.4	59.6	16.	8.	1.6	.4	—
July 4..........	62	4,332,800	12,400	17.2	52.8	17.2	11.6	—	1.2	—
“ 11..........	58	4,484,000	10,200	22.	56.4	12.4	8.4	.8	—	—
“ 18..........	61	5,657,600	12,400	13.2	63.2	16.	7.2	.4	—	—
“ 25..........	61	4,737,600	10,200	26.8	46.	18.4	7.6	.4	.4	.4
August 1..........	67	5,364,000	11,600	18.	58.	16.8	5.6	1.2	.4	—
“ 8..........	75	5,910,400	9,400	18.4	47.6	22.	10.4	1.6	—	—
“ 15..........	80	6,168,800	6,800	14.	58.	18.	10.	—	—	—
“ 19..........	83	6,200,000	12,200	31.6	46.8	13.2	6.4	2.	—	—

REMARKS.

June 27th, blood drop appears normal. Moderate poikilocytosis and polychromatophilia. Some macrocytes; many microcytes. August 19th, 50.6 normoblasts to cu. mm. July 4th, 49.6 normoblasts to cu. mm. August 19th, blood has steadily improved until it is now practically normal.

Treatment. No iron was given until July 20th.

June 28th, 2-15; July 11th, many ova uncin.; 12th, 2-10, preceded by .02 podophyllin; 14th, chill, fever, etc, diagnosed malaria, and quinine given; 15th, no chill, less fever; 16th, no fever; 18th, ova uncin.; 19th, 3-10, preceded by .02 podophyllin; 20th, began taking Blaud's pills; August 1st, few ova uncin.; 2nd, 3-10, preceded by .03 podophyllin; 8th, no ova uncin.; 16th, 2 ova uncin., 3-10, preceded by .02 podophyllin.

Result. Practically cured. Color good and feels perfectly well.

Case 58. M. A. S. C. Utuado. Admitted, June 27. Age, 6; male; white; from one of the best known families in Utuado. Sick one month. Previous treatment: He was No. 559 of general series; admitted, May 29th; very few ova uncin. found; given 1-10; June 6th, no uncin.; June 7th, 1-15; June 12th, no uncin. Returned the 27th of June with heavy infection. Food of best kind. No clear history of mazamorra but had a suspicious eruption between toes. Moderate pallor of mucous membranes but little of general integument. No edema; dry skin. No appetite; gastralgia; nausea; vomiting; tongue white coated; no tenderness of abdomen or epigastrium; constipation; no enteralgia. Feces, dark and semi-liquid, *enormous* number of ova of uncinaria, some of ascaris and tricocephalus (the largest number of ova we have seen). Spleen and liver normal. Breathless on slightest exertion. Palpitation; no precordial pain. Pulse, 96, a little weak and compressible. Short dry cough; no pain in chest. Dizziness; tinnitus aurium; no headache; sleeps well but uneasily; is very nervous and cries on being approached with lancet for puncturing ear, a rare circumstance as we have found among these children. Reflexes normal. Temperature 36.9°.

Course. This remarkable case was very carefully studied. The only possible skin infection must have occurred a couple of months before his first coming to clinic (May 29th). The extraordinary blood record was repeated to insure its correctness.

Diagnosis. Acute uncinariasis, slight case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June 27..........	65	4,352,000	7,200	9.5	57.5	27.5	2.	.5	3.	—
July 4..........	107	5,346,400	9,000	7.2	55.2	22.4	14.4	.4	.4	—

REMARKS.

June 27th, blood fluid and coagulates slowly. No poikilocytosis nor polychromatophilia.

Treatment. No iron used.

June 28th, 2-15, preceded by .01 of podophyllin. July 4th, no ova uncin.

Result. Cured, July 4th. It is remarkable that his symptoms should disappear in so short a time, but he is perfectly well now.

Case 59. S. O. Barrio, Salto Arriba. Admitted, June 28. Age, 35; female; mulatto, widow; housework and coffee picking. One brother died of anemia. She has been sick for several years, very ill for one year. Does not remember the beginning. Vegetable food, poor quality. Has taken "reconstituent pills" which did not reconstitute. Pallor very marked; no emaciation; development good. Has had puffiness of face, has now slight edema of trunk and legs. Had mazamorra; no pruritus; skin very dry and atrophied. Good appetite; gastralgia; little nausea and vomiting; flatulence; meteorism; ascites; tenderness over epigastrium and abdomen. Bowels irregular, alternating diarrhea and constipation; no enteralgia. Feces contain many ova of uncinaria. Dyspnea; much palpitation; pain over heart. Pulse, 126, very weak. Very pronounced hemic murmur, and scarcely detectable dilatation of heart. Pulsation in external jugulars. No cough. Great dizziness; tinnitus aurium; headache; no neuralgia; sleeps poorly; subject to syncope; reflexes good; mental condition, very bad; intelligence, scarcely any; expression, picture of misery. Paresthesias. Amenorrhea for 9 months; aborted about one year ago. Blurred vision. Muscles, very flabby, sore, and painful. Is too weak to walk without assistance. Temperature normal.

Course. Made no progress for three weeks, then improved rapidly. Towards end was cook's helper.

Diagnosis. Chronic uncinariasis. Extreme case.

DATE.	Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
June 28..........	18	1,212,800	11,200	4.8	72.8	6.4	16.	—	—	—
July 5..........	22	1,332,800	10,600	2.4	70.8	9.2	17.2	.4	—	—
" 12..........	16	964,000	5,600	8.4	79.2	6.4	6.	—	—	—
" 19..........	20	1,070,400	6,000	6.	74.	7.2	10.8	—	.4	1.6
" 26..........	30	2,408,800	2,200	2.	70.8	9.2	15.2	.4	2.4	—
Aug. 2..........	50	2,924,000	7,400	2.8	81.2	8.	6.8	.8	.4	—
" 9..........	67	4,332,800	5,600	4.	74.4	8.4	12.	.4	.8	—
" 16..........	74	4,530,400	4,600	7.6	75.2	8.8	8.4	—	—	—
" 19..........	75	4,842,800	7,400	4.4	68.	14.4	12.4	.8	—	—

REMARKS.

June 28th, blood pale, watery, and coagulates slowly. Extreme poikilocytosis and polychromatophilia, macrocytosis prevails. July 5th, 42.4 normoblasts to cu. mm. 12th, reds are greatly deformed. Macrocytes are most numerous and of great size, many larger than leucocytes. 67.2 megaloblasts and 44.8 normoblasts to cu. mm. 26th, reds improved. Still macrocytosis but cells appear less "washed out"; 8.8 megaloblasts and 8.8 normoblasts to cu. mm. August 2nd, appearance of blood much better. 19th, blood appears almost normal.

Treatment. Blaud's pills used in intervals.

June 30th, 4-15, preceded by .03 podophyllin; July 4th, tr. digitalis and tr. nux vomica; 6th, ova uncin.; 7th, thymol repeated; 13th, many ova uncin.; 14th, thymol repeated; 19th, few ova uncin.; 20th, thymol repeated; 26th, few ova uncin.; 27th, thymol repeated; August 2nd, no ova uncin.; 8th, no ova uncin.; 13th, stopped digitalis and nux vomica; 19th, no ova uncin.

Result. The improvement in this patient is remarkable. Has good color, no edema, slight murmur. Feels well except for some weakness.

Case 60. M. G. Barrio, Mameyes. Admitted, July 4. Age, 13; male; white; works sometimes on coffee plantations. Three brothers died of anemia. He has been ill six years. Has usual food of country. Has had much mazamorra. Has taken much iron. Marked pallor. Not emaciated. Edema of legs. General pruritus. Good appetite; sometimes gastralgia; nausea; no vomiting; flatulence; no tenderness of abdomen; some meteorism; constipated; sometimes enteralgia; feces, many ova of uncinaria, Charcot-Leyden crystals, and some ova of ascaris. Normal spleen and liver. Slight dyspnea; palpitation; precordial pain. Pulse, 90, strong and full. Heart enlarged, with systolic hemic murmur. Pulsation of vessels of neck pronounced. No cough but pain in chest. Much dizziness and tinnitus aurium; temporal headache. Sleep normal; reflexes normal. Expression sad and lifeless. Susceptible to cold. Urine; 1014, normal. Blurred vision. Muscles flabby, painful, and weak. Temperature 38 °.

Course. Rapid convalescence.

Diagnosis. Chronic uncinariasis. Marked case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
July	7	19	2,360,000	10,800	6.8	50.8	36.	5.6	.8	—	—
"	14	32	2,504,000	7,200	12.	53.6	23.2	5.6	1.2	4.4	—
"	21	58	3,800,000	5,600	11.2	57.2	29.2	.8	.8	.8	—
"	28	66	4,064,000	7,200	24.8	44.4	20.4	3.2	3.6	3.6	—
Aug.	3	90	4,808,000	8,200	18.8	40.4	32.8	3.6	.8	3.6	—
"	10	—	4,824,000	8,600	16.	42.4	29.2	4.	3.6	2.8	2.

REMARKS.

Usual blood changes for this type.

Treatment. Blaud's pills used in intervals.

July 8th, 3-10, with .02 podophyllin; 14th, many ova uncin.; 15th, 3-10, with .02 podophyllin; 21st, many ova uncin.; 22nd, 3-10, with .02 podophyllin; 28th, ova of uncin. and ascaris; 29th, 3-10, with .02 podophyllin; August 2, ova uncin.; 4th, 3-10, with .02 podophyllin; 11th, no ova uncin.

Result. Cured, August 11th, perfectly healthy and of good color.

Case 61. J. J. I. Barrio, Roncador. Admitted, July 17. Age, 11; male; white; coffee picker; his mother died of anemia; he has been sick one year; usual food of country; mazamorra often; has taken much iron. Marked pallor; not emaciated; edema face and legs; no atrophy of skin. Good appetite; gastralgia; no nausea or vomiting; flatulence; tender abdomen; meteorism; bowels constipated; sometimes enteralgia; feces contain many ova of uncinaria, Charcot-Leyden crystals, and meat fibers. Spleen and liver normal. Dyspnea; palpitation; precordial pain; pulse, 112 and weak. Slight hemic murmur and pulsation in vessels of neck noticeable. No cough nor pain in chest. Dizziness; much tinnitus aurium; frontal headache; sleep normal; patellar reflex absent. Is very dispirited. Susceptible to cold. Urine; S. G. 1010, normal. Blurred vision. Muscles, flabby and painful. Is very weak. Temperature 38°

Course. Very rapid convalescence.

Diagnosis. Chronic uncinariasis, marked case.

DATE.		Hb.	Red cells.	Leucocytes	E.	P.	S. L.	L. L.	B.	S. C.	My.
July	17..........	22	1,576,000	8,200	2.	78.8	18.4	.8	—	—	—
"	24..........	42	2,960,000	10,400	22.	61.6	14.4	.4	1.2	.4	—
"	31..........	64	3,356,000	5,800	16.	48.8	26.	6.8	1.2	.4	.8
August	7..........	71	3,656,000	5,400	24.4	48.4	17.6	6.8	2.4	.4	—
"	14..........	87	4,744,000	11,200	26.8	52.8	18.	2.4	—	—	—

REMARKS.

Usual blood changes of severe grade of uncinariasis.

Treatment. Blaud's pills used in the intervals.

July 18th, 2-10, with .02 podophyllin; 24th, ova uncin.; 25th, 2-20, with .02 podophyllin; 31st, no ova uncin.; August 2nd, 2-30, with .02 podophyllin; 7th, no ova uncin.; but many Charcot-Leyden crystals; 17th, no ova uncin. Discharged from hospital.

Result. Cured, August 17. Perfectly well. Good color.

BAYAMON.

Case 1. J. M. Admitted, March 6; ex-soldier in Spanish Army. Native of Province of Galicia, Spain. Has lived in Porto Rico 17 years. First fell ill while working on a sugar plantation near Bayamon, and his first trouble was a sharp attack of mazamorra. His employer paid him well, and his food was always excellent with plenty of meat, etc. Typical severe case of chronic uncinariasis with general edema, atrophy of skin, and advanced nervous and circulatory symptoms. A curious symptom was night-blindness which disappeared under treatment.

March 6: Hb. 27%; reds 3,728,000; whites, 8,400; eosinophiles, 7%. On April 20th, he had Hb. 81%, and eosinophiles 28.8%. He became our most trusted and efficient nurse and left us, a powerful ruddy man with 98% Hb.

Case 4. A. S. Municipal hospital. Age, 73; about moribund with tremendous edema of whole body; pulse, 150, dilated heart; all but unconscious. Hemoglobin 16%, eosinophiles 2.5%. We were told that the man had been for some time under stimulative treatment, and concluded that the only chance he had was to administer thymol. One gram was given with hypodermic stimulation. He died on the 12th, five days afterward, but without having shown the slightest symptom of intoxication from thymol.

Case 8. J. O. Admitted, March 8. Age, 60; female. Was a celebrity in town as the "swollen woman." Usual symptoms. Hb. 65%; eosinophiles 43.5%. On the 21st, of March, Hb. was 103%. Perfectly well.

Case 16. J. T. Admitted, March 11. Age, 30; book-keeper of a well-known company in San Juan; a man of education and refinement. Lives well. Used to be very ruddy and well. In October 1902, went hunting, and in kneeling bare-kneed in the mud to take aim at a bird, contracted mazamorra. The peon who accompanied him also contracted the infection. He said the itching began very soon after infection, and went through all the typical changes from papule to pustule. He began to get pallid in January 1903. Tried many iron tonics; ate great quantities of roast beef; took patented beef juices and all failing utterly, his physician advised a European trip, which he made. He returned to the Island, practically no better and came to us, presenting a picture of severe and what promised to be a fatal chronic uncinariasis. There was no complication of any sort and his case was thoroughly studied. An enormous number of ova of uncinaria was found in his stools. On March 11th, his Hb. was 24%, eosinophiles 8%. March 18th; Hb. 28%, eosinophiles 10%; April 1st; Hb. 54%. On April 30th, he was in apparent good health and color. On October 7th, he came to our office, ruddy, strong and without a sign of his previous disease. Hb. 115%. Eosinophiles 17%.

SYNOPSIS OF ALL DEATHS.

The majority of deaths occurred in our hospital, but to get a complete list of all deaths among our patients, the official copies of death certificates for the entire district of Utuado, kept in the Registrar's Office in that city and covering the period of our sojourn there, was compared with an indexed list of our patients, and a few more were found. This was not done for the Bayamon cases but their lesser number made it possible to keep track of them.

Of 5,500 cases of anemia, 5,490 of which were due to uncinariasis, we lost 27 patients. Fourteen of these died of uncinariasis, pure and simple, and of them, five never received an anthelmintic. Nine died of other diseases or of complications, with uncinariasis as a more or less potent contributing factor. Two of these died of direct sequelæ of uncinariasis. Five died of diseases in which uncinariasis was not, even remotely, a contributing cause.

Thus our total mortality from all diseases was .49%. Our mortality for uncinariasis alone was .25%, and including all those who died from uncinariasis alone or as a concurrent cause .41%.

Case reported under morbid anatomy was not a patient of this Commission during its field work, and is not included in the 5,500 cases.

BAYAMON.

Case 4. A. S. In municipal hospital for some time previous to March, 1904. Arrived in last stages of chronic uncinariasis with tremendous anasarca. Had received stimulants, etc. in hope of building up his strength preparatory to taking anthelmintic, but without success. Hemoglobin 16%, E. 2.5%, P. 91.%, S. L. 5.%, L. L. 1.5%. In view of the fact that the patient's only chance for recovery was specific treatment, 1 gram of thymol was administered, preceded and followed by magnesium sulphate. No bad effects of the drug were observed but the patient steadily sank and, on March 12th, succumbed from exhaustion.

Cause of death: Chronic uncinariasis, extreme grade.

Case 207. J. C. Aged 10, extremely emaciated but not very anemic (Hb 65%). He stated that he walked from Ciales, with some people who abandoned him on the way. Was very weak. Deglutition very difficult owing to stricture of the esophagus. Infection by uncinaria recent and severe. One day of concentrated food and stimulation. Two grams of thymol with magnesium sulphate was administered on second day in hope of ridding him of, at least, some of his uncinariæ, but he died of exhaustion on the third day.

Cause of death: Stricture of the esophagus.

Contributing causes: Privation and acute uncinariasis.

UTUADO.

Cases 17, 33, and *42* are given in full under the account of special cases, Utuado series.

Case 18. G. C. Admitted to hospital, May 11; male; age, 40. Stools were very liquid and contained much mucus but no blood. History of severe intermittent diarrhea. Many ova of uncinaria and ascaris. Was profoundly anemic and emaciated, but had no edema. Was extremely weak. Hb. 19%. Given 4-40, on May 13th. He seemed much better in the next two days but on the 16th, he was attacked by a furious diarrhea with much weakness. Given opium and bismuth, and hypódermic stimulation by strychnine and digitalin. This treatment was continued till day of death, May 20th.

Cause of death: Chronic entero-colitis. Contributing cause: Chronic uncinariasis, severe grade.

Case 25. M. H. Admitted to hospital, May 11; male; age, 55; marked case; many ova of uncinaria; Hb. 30%. Given 4-40. Left hospital, May 17th, slightly improved. Readmitted with profuse diarrhea, May 31st. Died, June 9th.

Causes of death: Chronic uncinariasis, severe grade, and chronic entero-colitis.

Case 55. J. S. female, 35 years of age, many ova of uncinaria. Was brought to hospital in a hammock, dying with profound anemia and extreme anasarca. Energetic stimulation was administered hypodermically but she succumbed nine hours after her arrival. She did not receive an anthelmintic.

Cause of death: Chronic uncinariasis, extreme grade.

Case 76. L. M. Admitted to hospital, May 13. Age, 70; male. Seemed to be suffering more from old age than anything else, but was anemic and had ova of uncinaria in his stools which were dysenteric with blood and mucus. He was given 2-30. From that time on, he received opium and irrigations of the colon for his dysentery, and stimulants for debility. He died June 12th.

Causes of death: Senectud and dysentery. Contributing cause. Chronic uncinariasis.

Case 109. N. M. Admitted to clinic as outpatient, May 14. Female; age, 35. Had marked anemia and a great many ova of uncinaria. She also had advanced pulmonary tuberculosis. Given 2-30, and never returned, dying, the middle of July, of pulmonary phthisis.

Cause of death: Pulmonary tuberculosis.

Case 182. G. C. Admitted, May 13, to hospital. Age, 58; male. Almost moribund with dilated heart and marked anasarca. Had some anemia and many ova of uncinaria in stools. For two days he received hypodermic injections of strychnine and digitalis, and, on May 15th, 2-15. From this time until the 19th, the injections were continued, with Peptomangan by mouth. On the latter date, the hypodermic medication was supplanted by tincture of nux vomica and digitalis. Opium was administered to control a short attack of diarrhea. Adrenalin was added to the other cardiac remedies but in spite of all, we were obliged to perform paracentesis to relieve him of the pressure caused by the extreme ascites. May 29th, he felt much better, and 4-20 was administered. June 6th, the ascites was worse than ever. No albumin in urine. Paracentesis repeated and 10 liters of fluid removed. June 15th, the anemia was much improved. He had 65% of hemoglobin but the heart signs were worse. Died July 16, despite all effort to establish compensation of the heart.

Cause of death: Dilatation of the heart due to organic lesions secondary to chronic uncinariasis, marked grade.

Case 183. P. A. Admitted to hospital, May 13. Age, 70; female. Was brought in hammock. Was in last stages of chronic valvular disease of heart, a probable sequela of chronic uncinariasis judging from her previous history. Ova of uncinaria found in stools. Hb. 69%. Treatment: hypodermic stimulation by means of strychnine and digitalin. No anthelmintic administered. Died, May 20th.

Cause of death: Mitral insufficiency and dilatation of heart.

Case 405. I. H Admitted to hospital, May 21. Age, 55; male. Marked case. May 23rd, given 3-25. He was sent home May 25th, at his own request. June 24th, his card was brought by his daughter who stated that her father was very sick; that he was very constipated and vomited all he ate. A bottle of Peptomangan, and cascara sagrada tablets were sent him. On July 9th, his daughter brought her father's card, saying that he was very weak and had profuse diarrhea. He was sent opium and astringents, but died about the middle of the month.

Cause of death: Chronic uncinariasis, severe grade,

Case 407. B. C. Admitted to hospital, May 23. Age, 25; female. Light case of uncinariasis but had extreme grade of pulmonary tuberculosis with cavities in both lungs. Ova of uncinaria found in stools. May 24th, 2-20, June 4th, few ova of uncinaria. Given 4-25. Died at home in latter part of July.

Cause of death: Pulmonary tuberculosis.

Case 536. M. A. Admitted to clinic as outpatient, May 29. Age, 15; female. Had marked anemia; many ova of uncinaria; given 2-25. June 14th, some ova uncinaria; given 2-25. June 26th, no ova uncinaria; given Blaud's pills. July 4th, brought in hammock to the hospital. Was very edematous. Given 3-10, with .02 podophyllin, as ova of uncinaria were found. Returned home several days later. July 24th, specimen of feces brought by father who said that she was very ill with edema, great weakness, and some diarrhea. Blaud's pills were repeated. August 13th, father brought card saying that she died on the 26th of July.

Cause of death: Chronic uncinariasis, extreme grade.

Case 606. M. J. Admitted to hospital, May 22. Age, 13, male. Was brought in a hammock, moribund, semi-conscious, and tremendously swollen. He presented symptoms of effusion of serum into the ventricles of the brain. Became unconscious, passing feces and urine involuntarily. A great many ova of uncinaria were found but no anthelmintic was given. Stimulants freely administered hypodermically. Died May 25th, in a comatose state.

Cause of death: Edema of ventricles of brain, due to chronic uncinariasis, extreme grade.

Case 791. P. R. Admitted to hospital, May 23. Age, 42; male. Marked case. Constant pain in stomach with vomiting of blood. Many ova of uncinaria. Given 3-30. June 1st, still ova uncinaria; given 3-30. Died, June 6th.

Causes of death: Chronic uncinariasis, severe grade, and ulcer of stomach.

Case 895. J. R. Admitted to clinic as outpatient, June 8. Age, 14; female. Moderate anemia but was a severe case of acute phthisis, with sputum loaded with tubercle bacilli. Given 2-15. Never returned. Died about the middle of July.

Cause of death: Pulmonary tuberculosis.

Case 1329. J. S. Admitted to clinic as outpatient, June 19. Age, 19; male; negro. Had a moderate grade of anemia but many ova of uncinaria. Given 4-30. Coming for his second visit, he fell into a stream, got very wet, and returned home. As a result of this, he contracted pneumonia, and was brought to hospital, June 27th. Examination revealed consolidation of the greater part of the right lung. This extended to the other lung, and he died, July 1st, in spite of appropriate treatment.

Cause of death. Double lobar pneumonia.

Case 1358. F. R. Admitted to hospital, July 22. Age, 25; male. Many ova of uncinaria. Great anasarca; profound anemia; signs of compression of brain by effusion of fluid into ventricles. Died, July 24th. No anthelmintic administered.

Cause of death: Edema of ventricles of brain due to chronic uncinariasis, extreme grade.

Case 1400. J. R. C. Admitted to clinic as outpatient, June 20. Age, 25; male. Marked case. Many ova of uncinaria; given 4-30. Anemia became more profound, and he died, July 10th.

Cause of death: Chronic uncinariasis, extreme grade.]

Case 1443. J. M. M. Admitted to clinic as outpatient, June 21. Age, 40; female. Very marked case; great many ova of uncinaria. Died, July 3rd.

Cause of death: Chronic uncinariasis, extreme grade.

Case 2231. R. M. Admitted to clinic as outpatient, July 2. Very extreme case; many ova uncinaria. Given 2-10. Died, July 9th.

Cause of death; Chronic uncinariasis, severe grade.

Case 2551. F. P. Admitted to clinic as outpatient, July 6. Age, 20; male. A moderate case. Many ova uncinaria; given 3-20. July 13th, still ova uncinaria; given 3-20, in hospital as boy said he had no home. He worked around the hospital grounds, seemingly improving steadily, but on July 20th, he went to town and got hold of some spoiled jerked beef. That afternon he was taken ill with ptomaine poisoning, and in spite of all measures taken, died the following day.

Cause of death: Ptomaine poisoning.

Case 3095. M. R. Admitted, July 11. Very marked case with great anasarca. Given 4-25. Died at home, middle of July.

Cause of death: Chronic uncinariasis.

Case 3418. M. S. A. Admitted, July 10. Age, 30; female. Very marked case. Hb. 15%. Heart dilated. Tubercular cavities in both lungs. Strychnine and digitalin given hypodermic ally every 3 hours. July 12th, 2-10 was given. On the 16th, diarrhea supervened. On the 19th, many ova of uncinaria were found. 2-20 was given with .02 podophyllin. She died, July 21st.

Cause of death: Pulmonary tuberculosis. Contributing cause: Chronic uncinariasis, severe grade.

Case 4438. V. R. Admitted, July 23. Very severe case. Great anasarca; great debility; profuse diarrhea. No anthelmintic administered, but stimulants and astringents given. Died August 5th.

Cause of death. Chronic uncinariasis, extreme grade.

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